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EXPLORING THE FACTORS INFLUENCING UNIFIED PAYMENTS INTERFACE (UPI) ADOPTION AMONG SENIOR CITIZENS IN INDIA

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ABSTRACT

This research investigates the factors impacting Unified Payments Interface (UPI) adoption among the elderly in India. We conducted semi-structured interviews with 17 senior citizens in the Indian state of Tamil Nadu, where questions were developed based on themes from UTAUT2 constructs. The study identified both facilitators and challenges influencing UPI adoption among senior citizens. While some perceived trust in family members, perceived usefulness, social influence and policy mandate as significant determinants of UPI adoption, others express concerns about self-efficacy, their physical wellbeing and the system's complexity. Moreover, the research underscores the importance of addressing the language barrier, lack of support and security concerns to promote UPI adoption among this segment of the population for financial inclusion in India. Based on the findings, recommendations are proposed for FinTech service providers to improve user experience and address senior-specific needs. Additionally, we propose for policy changes to promote awareness and support initiatives for the senior citizens demographic. This research contributes to the literature on internet banking adoption among the elderly, providing valuable insights that can be utilized by other developing nations. The insights developed from this study can inform the development of financial inclusion initiatives and equip businesses in tapping into the vast, yet underserved market segment of senior citizens.

Keywords: UPI, Financial Inclusion, Senior Citizens, Technology Adoption, Mobile Banking

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1 INTRODUCTION

In recent years, banking services have been increasingly shifting online on a global scale (Jin et al., 2021). Mobile banking is one such service that offers numerous benefits for customers, such as ubiquity, convenience, and cost-efficiency (Lin, 2011). Information Systems researchers assert that mobile banking is one of the most significant technological innovations, emerging as a key platform for expanding banking services through handheld devices (Herzberg, 2003; T. Laukkanen & Lauronen, 2005). The involvement of all the segments of population in the formal financial system is a crucial element influencing countries economic growth, as financial inclusion offers numerous benefits and opportunities for individual citizens (Mohapatra et al., 2020). Therefore, fostering financial inclusion and promoting the widespread adoption of digital payment systems are critical components of advancing the digital economy, especially in growing economies like India.

India's digital payment transactions recorded a development pace of 58.4% during 2018-19 compared to previous fiscal year which was 50.4% (Shifa Fathima, 2020). This increase in trend was due to the influence of external factors such as ease of use, customer service and satisfaction, accessibility, privacy, and instant refunds. These factors need strengthening due to dual spouse income and limited time for banking services (Mehta & Shah, 2020). Additionally, this increasing trend in the usage of digital banking is also fuelled by various government initiatives like *'Digital India'*, *'Lucky Grahak Yojana'* and *'Digi-Dhan Vyapar Yojana'*. Technology advancement and increase in mobile internet infrastructure in the country also played a vital role in this growth. The National Electronic Fund Transfer (NEFT), Immediate Payment Service (IMPS), and Aadhaar Enabled Payment System (AEPS) have been established for some time, however, the emergence of the Unified Payments Interface (UPI) payment system has revolutionized transactions, offering unparalleled ease and efficiency compared to other systems.

UPI is a real time payment system that facilitates seamless and secure electronic fund transfer through its interoperable architecture between bank accounts (Gochhwal, 2017). Researchers are increasingly interested in studying

this novel technology in developing country contexts but there are few existing literatures. Fahad and Shahid (2022) explored the determinants of the adoption of UPI using the diffusion of innovation theory. Similarly, Saha and Kiran (2022) utilized UTAUT2 methodology to study UPI adoption among baby boomers. However, there are very limited studies measuring the impact of UPI on the financial inclusion of seniors in India (Gochhwal, 2017), and other demographic segments of the country.

When considering the acceptance and use of such ICT, certain demographic segments appears to exhibit resistance to innovation and skepticism (Jahanmir & Lages, 2015, 2016). Senior citizens are one such segment that exhibit resistance to innovative technology like UPI and still prefer physical banking. Considering the scarcity of research on mobile banking and the elderly (Choudrie et al., 2018), particularly regarding the adoption of UPI among senior citizens in the context of India. We were motivated to study the factors impacting the acceptance of UPI among senior citizens in India. This research paper primary aim is to answer the following research question:

RQ1: How do senior citizens perceive UPI? Are there any enabling factor for UPI adoption among elderly?

RQ2: Why are senior citizens hesitant to adopt UPI for their financial transactions?

To answer the research question, we are utilizing themes derived from UTAUT2 model by Venkatesh (2012) as our theoretical framework. Themes from this model guided the development of our qualitative interview questions. Following these interview questions, we conducted in-depth, semi-structured interview with 17 senior citizens in the state of Tamil Nadu, India. Through the research findings, we establish the factors influencing the adoption of UPI among senior citizens in India, shedding light on the motivational factor related to the intention to adopt UPI by senior citizens.

Our research findings provide a nuanced understanding of the challenges and facilitators of UPI among the elderly in India. Based on these challenges we propose certain design changes aimed at FinTech service providers and advocate for policy changes aimed at policymakers for better support and awareness targeted for this segment.

Lastly, we highlighted the drawbacks of the current research work and present directions for future research. Furthermore, our results provide a foundation for future research endeavours on mobile banking adoption among the elderly in other developing nations.

2 LITERATURE REVIEW

The review of literature on this topic varies from the digitalization of payment services in India, UPI as an innovative technology, the effect of UPI on economic development and acceptance of UPI, and studies on the elderly and technology acceptance along with a review on technology adoption theories in Information Systems. However, there is a lack of literature addressing UPI and senior citizens, which this study addresses.

2.1 Digitalization of Financial Services in India

Digital Revolution has swept the globe over the past three decades and the growth is accelerating even faster in developing countries (Panagariya, 2022). Digitalization is frequently associated with digital innovation or digital transformation (Barroso & Laborda, 2022). According to Fichman et al. (2014), digital innovation is a "*product, process, or business model that is perceived as new, requires some significant changes on the part of adopters, and is embodied in or enabled by IT*". Vial (2019) define digital transformation as "*a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies*". This digital revolution has impacted every sector including the banking sector. Similar to other nations this digitalization movement has completely transformed the financial infrastructure in India as well (Panagariya, 2022). This digitalization of financial services has revolutionized how India conducts banking and financial transactions. Shifa Fathima's (2020) study reports that the two main reasons for the Indian banking sector to adopt digitalization were the development of new technologies and change in the customer expectations.

The digitalization of Indian banks began in the 1980s primarily for digital record keeping (Shifa Fathima, 2020), but has gained momentum with the implementation of significant financial reforms in the Indian subcontinent during the early 1990s. These reforms included the entry of private and international

banks into the banking sector, which was previously state-owned (Gulati et al., 2023). This financial liberalization of the Indian banking sector not only established an efficient, competitive and profitable banking sector that contributes to the Indian economy (Mostak Ahamed, 2017) but also accelerated the digitalization of the Indian banking sector. The transition of the Indian banking sector from legacy systems to digital platforms has also facilitated the financial inclusion of less privileged individuals in society, bringing them into the mainstream socioeconomic platforms (Kanungo & Gupta, 2021).

The digitalization of the banking sector has seen a further acceleration during the internet era. Banks started to leverage internet technologies to introduce a wide range of services including electronic fund transfers and ATMs (Mohsin et al., 2023). Furthermore, it allowed banks to offer a wide range of internet banking services, allowing customers greater convenience and accessibility to financial services (Hassan & Meraj, 2019). Transacting digitally has become more prominent in recent years, which is why the Reserve Bank of India (RBI) has introduced various digital transaction systems in India namely Electronic Fund Transfer (EFT), Point of Sale (POS) terminals, National Electronic Fund Transfer (NEFT), Immediate Payment Service (IMPS), Aadhaar Enabled Payment System (AEPS) and Unified Payments Interface (UPI). However, there were a few factors impacting the adoption of digital transactions, as additional transaction charges were imposed on digital transactions. People were gradually adopting digital payment methods, yet unwilling to pay extra for digital transactions (Chaubey & Kumar, 2017). The government has taken steps to reduce transaction charges associated with digital transactions, while also eliminating the minimum transfer amount requirement that previously incurred additional fees. These reforms, along with other factors, have encouraged people to embrace the digital payments system. It has also revolutionized the way Indians conduct financial transactions (Mohsin et al., 2023). The digitalization of financial services has not only enhanced the speed, security, and transparency of transactions but also serves as a tool for promoting financial inclusion, especially in rural and remote areas. As per RBI reports, the number of digital payments has increased from 1.62 million transactions during the financial year 2012-13 to over 14,726 million transactions in 2023-24, representing an almost 90-fold increase. Also, India accounts for 46% of global digital transactions (Reserve Bank of India, 2024).

This surge in digital transactions can largely be attributed to the rise of mobile-based payment systems in India. Mobile-based banking enables customers to perform various financial transactions remotely using a mobile device like a phone or tablet, through software provided by banks or financial institutions (Chaubey & Kumar, 2017). While India offers many mobile-based banking systems, the Unified Payments Interface (UPI) has emerged as the forerunner. The following section explores UPI in more detail.

2.2 Fundamentals of UPI

To promote digital payments in India, the Reserve Bank of India (RBI) established the National Payment Corporation of India (NPCI) as an umbrella organization tasked with developing a low-cost digital payment system (Gochhwal, 2017). In August 2016, the National Payments Corporation of India (NPCI) introduced UPI as an inclusive retail payment system. UPI was designed as an open interface, enabling diverse stakeholders such as banks and mobile wallet service providers to construct applications on a shared infrastructure. The open and standardized UPI system, which supports both peer-to-peer and peer-to-merchant transactions, is based on a common Application Programming Interface (API) that allows for digital payments via mobile phones. The following key actors comprise the UPI ecosystem, as illustrated in the below figure (figure 1) sourced from article 'How Does UPI Work?' (2022):

Payment service providers (PSP) offers an interface to both payer and the payee. Unlike digital wallets, payers and payees can use different PSP's due to their interoperability (Chaterji & Thomas, 2017). PSP enables both financial transactions and non-financial transactions. Non-financial transactions include customer registration on the platform, virtual payment address creation, set and change MPIN, OTP request and balance check. Financial transactions includes pay and collect payments based on virtual payment address, phone number, aadhaar number and account number along with IFSC code (Gochhwal, 2017).

Financial institutions, such as banks, will handle the underlying accounts for both the payer and the payee. In some cases, the banks and the payment service providers might be the same entity. (Gochhwal, 2017).

NPCI acts as the central hub. It directs payments to the correct virtual address and handles the transfer of money between banks through the Immediate Payment Service Platform (IMPS) ensuring the settlement of funds across banks (Chaterji & Thomas, 2017). NPCI also acts as the central repository that links customer's mobile number, bank account, aadhaar number and virtual payment address (Gochhwal, 2017).
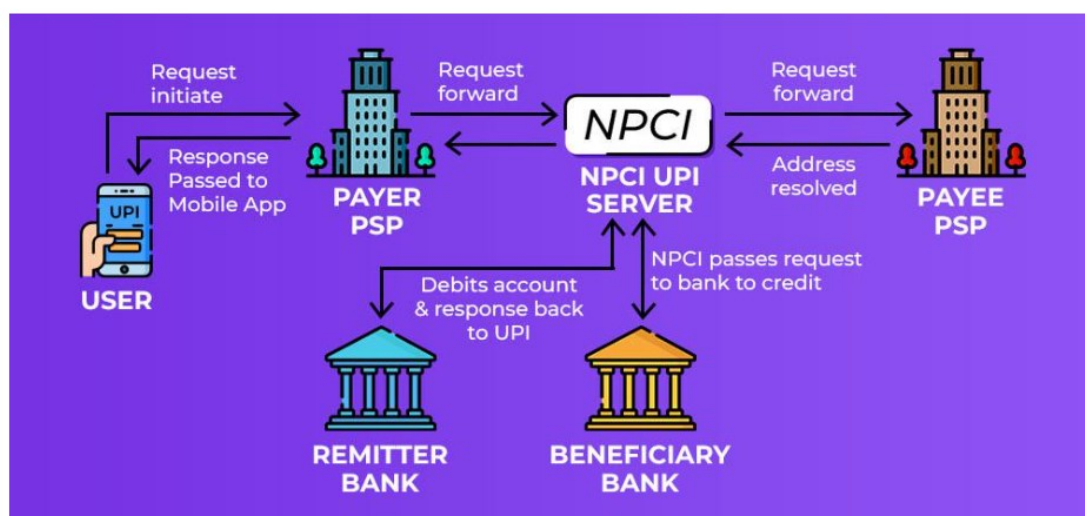
FIGURE 1 UPI Ecosystem

This new payment system emerged as an alternative to the traditional banking system and was adopted by the general population after two pivotal changes in India—namely, the Demonetization policy and the global COVID-19 pandemic. A study conducted by Saha and Kiran (2022) aligns with this observation, suggesting that demonetization acted as an initial impetus, leading to the acceptance of mobile payments by Indians. Later, the COVID-19 pandemic further accelerated this trend, potentially serving as the primary driver for UPI adoption among baby boomers.

Several studies were conducted across India during the demonetization period to investigate the adoption of mobile banking among street vendors, shopkeepers, and other micro and small business owners in response to this phenomenon (Joshi et al., 2019; Kurosaki, 2019). After demonetization, the government promoted the adoption of digital payments to reduce the economy's dependency on cash, which requires a big behavioural and social transformation (Bhadauria & Prakash, 2017). The government's "Digital India" campaign has further accelerated and played a pivotal role in the digitalization of the banking and payment sectors (Fahad & Shahid, 2022). However, people were still hesitant to adopt UPI. To address this several incentives were introduced, like referral bonuses and transactional rewards which encouraged customers to adopt mobile payments (Vashistha et al., 2019). When the digital transactions trend was seeing an upward trajectory COVID-19 pandemic occurred, which forced the late adopters to accept digital transactions since there was no other means of transaction. The outbreak of COVID-19 has impacted the Indian economy to a greater extent, it has accelerated the adoption of UPI and other digital payments as consumers preferred to stay away from cash (Adhikari et al., 2022).

This made researchers show interest in exploring this new field of banking services. Existing literature is more concentrated on either theoretical or operations of UPI (Fahad & Shahid, 2022; Rastogi et al., 2021). In theoretical studies,

researchers explore into UPI's potential to attract a wide audience (Rastogi et al., 2021). In operational studies, researchers explore UPI's operational strength as a tool for digitalizing financial services for the general population (Fahad & Shahid, 2022). In one of the theoretical studies, the potential of UPI to attract a larger population is examined and explained, revealing that participants educational level influences their adoption of UPI (Gupta & Kumar, 2020). Another study explained the growth of smart phones and the penetration of internet services in rural areas which gives great potential for UPI (Kakadel & Veshne, 2017). One of the operational studies investigating the efficiency of UPI reveals that its fund transfer mechanisms, both online and offline, are effective (Mohapatra, 2017). However, there is a lack of literature regarding financial inclusion and UPI.

When it comes to increasing financial inclusion, FinTech, mobile, and other technological drivers are very efficient (Rastogi et al., 2021). However, acceptance studies on these technologies often fail to encompass all demographic factors. For example, factors like age (Kuoppamäki et al., 2017) and gender (Hohlfeld et al., 2013) are significant determinants influencing individuals' attitudes and behaviours toward the adoption of new technologies and the embrace of digitalization. According to Peacock and Künemund (2007) study, age continues to be a significant factor in senior citizens usage of the internet and digital technologies. Similarly, a discernible void remains in exploring UPI acceptance across various demographic groups, particularly with inadequate attention given to the senior citizen segment. Notably, Fahad and Shahid's (2022) study investigated the factors affecting the adoption and recommendation of the UPI payment system across five Indian cities. Employing the diffusion of innovation theory as its theoretical framework, the study, however, allocated minimal importance to the elderly citizens perspective. Furthermore, Nandal et al. (2021) study on digital payment app acceptance in India surveyed 200 customers across different age groups (16-30, 31-45, 46-60, and 61 and above), revealing a preference for UPI as a payment method. However, the lack of specific participant counts within each age group raises uncertainty, particularly in the 61 and above category, which may or may not include senior citizens aged 70 and above. This ambiguity in participant demographics challenges the precision of the findings. Additionally, the research does not explore the nuanced factors influencing the adoption of digital payment methods among the elderly, highlighting a notable gap in understanding the specific needs and barriers faced by this demographic. Considering the aforementioned research gap, this study seeks to shed light on the unique obstacles that one demographic group, senior citizens, face in embracing UPI.

2.3 Financial Inclusion of Elderly

By the year 2050, WHO projects that the global elderly population will surpass twice the size recorded in 2015, with the number of individuals aged 80 or older

expected to have more than tripled since that same year (WHO, 2015). These trends are reflective of a global phenomenon (Macedo, 2017). In India, the India Ageing Report 2023 predicts that by 2050, the proportion of senior persons – those aged 60 and more — will increase to 20.8% of the population. That is close to 347 million. This is a sharp increase from the 2022 demographic of 149 million senior people, which represented 10.5% of the country's population (India Ageing Report, 2023). Though there is a rise in elderly population there is still limited research conducted on analysing age-related differences in participation and knowledge variables impacting senior citizens involvement in digitalization and India's digital economy (Sen, 2020). Prior research has widely shown the numerous benefits associated with ICT use among older persons. These advantages span a variety of dimensions, including individual benefits where increased access to current affairs and health information fosters social and self-understanding. There are also social benefits, such as improved connectivity and social support networks to strengthen their relationship. Finally, practical benefits as ICT makes daily work, travel, shopping, and finances much easier (Hough & Kobylanski, 2009). This can be attributed to the widespread penetration of smartphones and high-speed internet access in global markets. According to a study by Chandra (2019), smartphones have emerged as the predominant means of internet access among India's elderly population. However, only a small fraction, 17.1 percent, of the elderly engage in online banking or internet-based financial transactions. In response to this low adoption rate, efforts have been underway to raise awareness and promote technology usage among the elderly in India. Notably, the Indian government has been actively advocating for developing technology tailored to the elderly, aiming to improve their well-being and encouraging active lifestyles (Kumar & Banerjee, 2020).

Despite the government's active promotion of ICT acceptance among the elderly, there is a significant lack of research on senior citizens' views about technology. Older individuals are a diverse group encompassing varying interests, educational background, health conditions, and socioeconomic backgrounds (Lee & Coughlin, 2015). This diversity presents a challenge for researchers studying technology acceptance and usage within this demographic. Hence, further research is crucial to fully understand their views on online banking and technology use (Kumar & Banerjee, 2020).

The inclusion of the elderly into society remains a prevalent challenge, particularly concerning their financial integration. (Msweli & Mawela, 2021). Previous studies in developing countries reveal two key challenges for older adults, which are limited awareness and access to financial solutions that support them (GPFI, 2019). Digital banking has emerged as a crucial tool for financial inclusion in developing countries, especially for isolated and financially underprivileged segments (Tay et al., 2022). Despite the exciting possibilities of digital banking for financial inclusion, the elderly population faces unique challenges adapting to this rapidly evolving technology. The exponential growth of technology creates a significant hurdle for older adults, hindering their ability to embrace digital banking solutions.

Exploring deeper into this digital landscape, the following research has shed light on significant challenges faced by older adults when it comes to the adoption and use of technology. As individuals age, there is a decrease in information processing abilities, leading to a decline in learning rate and a tendency to avoid unfamiliar circumstances (Sintonen & Immonen, 2013). This general decline in processing speed among the elderly has negative impacts on both the cognitive functions and motor skills of older adults (Kalman et al., 2015). Senior citizens possess low self-efficacy and anxiety which hinders their use of internet banking services Peral-Peral et al (2020). Security and privacy were identified as significant concerns for senior citizens, who expressed anxieties regarding potential unauthorized access to their bank accounts and personal identification numbers (PIN) by hackers (T. Laukkanen & Kiviniemi, 2010). So senior citizens with privacy concern would rather receive support from a trusted person than use technology (Fischer et al., 2014). Another significant barrier is the complex nature of the technology (Joseph, 2010). Some older adults prefer in-person interactions as they value personal contact and social interaction, which may contribute to resistance towards technologically based services such as mobile banking adoption among this demographic (T. Laukkanen & Kiviniemi, 2010). Hence, conventional or branch banking consistently emerges as the most preferred banking method among the elderly (Jayachandran, 2019). Another primary reason senior citizens are hesitant to adopt technology is due to a perceived lack of necessity or interest, although this mindset is expected to evolve in the future as the elderly are increasingly showing interest in technological advancements (Choi, 2011).

As the digitalization of financial services expands, people in the marginalized demography are at the risk of being left behind. In addition to the aforementioned factors, limited literacy, inadequate digital skills, declining physical health, social isolation, and dependence on family support further contribute to their exclusion (GPFI, 2019). This discussion also raises another noteworthy aspect that the elderly people can learn and master technology if they are motivated to do so. Unlike younger generations, external incentives have a limited impact on this demographic, as novelty alone does not motivate them to adopt the technology (Sen, 2020). Rather for the elderly, the technology in question must be perceived as fulfilling a specific need in their lives and must be regarded as being usable (Hanson, 2010).

Despite substantial research into technology adoption in the larger population, there is a noticeable lack of attention to customers and users among senior citizens. In the context of India, very few research about senior citizens perspectives towards UPI has been carried out. This underlines the lack of research that focuses on non-users, indicating a major gap in the existing knowledge. Addressing these gaps could strengthen the existing body of knowledge and contribute valuable insights for the development of targeted strategies to enhance banking inclusion among the elderly population in India. To understand senior citizens perspectives on UPI, a guiding framework is required, particu-

larly a one based Information Systems technology acceptance theory, which is covered in detail in the following section.

2.4 Review on Theories of Adoption

There are quite a few technology acceptance theories in Information systems developed by practitioners and developers to study technology acceptance among individuals (Momani & Jamous, 2017). In recent years, technology acceptance theories have been utilized not only in Information Systems but also in various other disciplines like Sociology, Social Psychology and Innovation management, impacting various sectors (Macedo, 2017). Technology acceptance theories aim to explain and predict user behaviour, specifically their intention to use technology (Taherdoost, 2018). The following table (table 1) provides a brief overview of the most common theories and models employed in technology acceptance research, along with the core constructs.

TABLE 1 Theories on Technology Acceptance

Theory/Model	Core Constructs
Theory of Reasoned Action (TRA) (Ajzen & Fisbbein, 1974)	1. Attitude Towards Behaviour 2. Subjective Norm
Theory of Planned Behaviour (TPB) (Ajzen, 1991)	1. Attitude Towards Behaviour 2. Subjective Norm 3. Perceived behaviour Control
Social Cognitive Theory (SCT) (Bandura, 1986)	1. Outcome Expectations: Performance 2. Outcome Expectations: Personal 3. Self-efficacy 4. Affect 5. Anxiety
Innovation Diffusion Theory (IDT) (Rogers, 1995)	1. Relative Advantage 2. Ease of Use 3. Image 4. Visibility 5. Compatibility 6. Results Demonstrability 7. Voluntariness of Use
Technology Acceptance Model (TAM) (Davis, 1986)	1. Perceived Usefulness 2. Perceived Ease of Use

Extension of TAM (TAM2) (Venkatesh & Davis, 2000)	1. Perceived Usefulness 2. Perceived Ease of Use 3. Subjective Norm
Technology Acceptance Model (TAM3) (Venkatesh & Bala, 2008)	1. Perceived Usefulness 2. Perceived Ease of Use 3. Subjective Norm
Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003)	1. Performance Expectancy 2. Effort Expectancy 3. Social Influence 4. Facilitating Conditions
Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) (Venkatesh et al., 2012)	1. Performance Expectancy 2. Effort Expectancy 3. Social Influence 4. Facilitating Conditions 5. Hedonic Motivation 6. Price Value 7. Habit

Source: Adopted from (A. Rahman et al., 2021)

The theories and models referenced above can be interconnected and analysed in relation to each other over time. Rondan-Cataluña et al., 2015 have provided a simplified representation of the progression of theories and models till date in the following figure (figure 2). Over the years, the theories and models have been reviewed and compared by many researchers, such as Taherdoost (2018), Momani and Jamous (2017) and FakhrHosseini et al., (2022). Their findings suggest that technology acceptance theories are continuously evolving and adjusted to study context, however they still exhibit some shortcomings in fully explaining user behaviour and their intention to use. To select the most appropriate theoretical framework for this study, a comprehensive review of technology acceptance theories is required. The following section provides an overview and discusses limitations of existing models and explain why themes developed from UTAUT2 constructs are particularly well suited for our research on senior citizens perspectives on UPI.
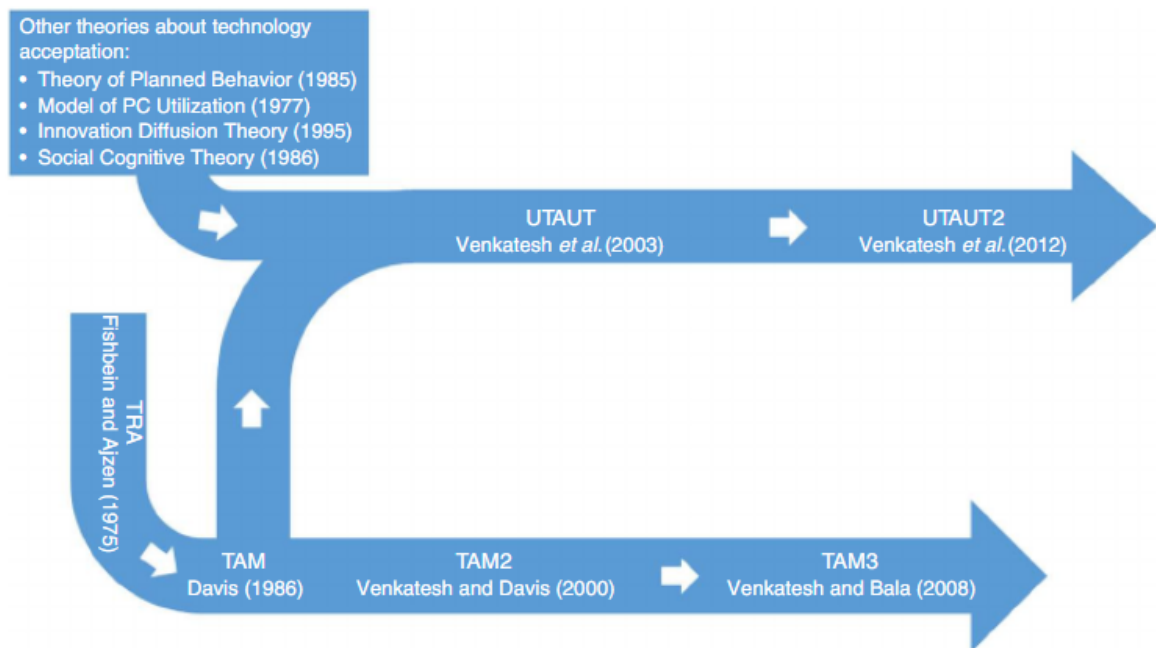
FIGURE 2 Theories About Technology Acceptance

2.4.1 Theory on Reasoned Action

The Theory of Reasoned Action (TRA) was developed by Ajzen and Fishbein (1974) in Social Psychology to predict human behaviour. It was the first theoretical perspective to gain widespread acceptance in technology acceptance research. Based on this theory, attitude (A) and subjective norms (SN) are the two predictors of behaviour intention (BI) (BI=A+SN) (Lai, 2017). Adoption literature positions TRA as a mediating model. It explains how controllable and uncontrollable variables influence user behaviour through psychological variables, ultimately impacting user acceptance (Davis et al., 1989). The main disadvantage of TRA is the missing role of moral variables (Taherdoost, 2018).

2.4.2 Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) is the successor of TRA. It introduces the third independent determinant of intention which is Perceived Behaviour Control (PBC). By adding PBC, realistic limitations as well as self-efficacy are considered (Ajzen, 1991). In TPB, BI is calculated by PBC, subjective norm and attitude. While TPB provides valuable insights into why people adopt technologies, the main drawback associated with it is that its focus on attitudes might be less relevant when accessibility barriers prevent user interaction in the first place (Taherdoost, 2018).

2.4.3 Social Cognitive Theory

Social Cognitive Theory (SCT) is inspired by the Social Psychology discipline. SCT is explained as *"how people adjust their behaviour through control and motivation to achieve goal-oriented behaviour that can be attained over a period"* (Oyibo et al., 2018) SCT emphasises the interplay of three main factors: behaviour, personal and environmental factors. These factors interact to influence how learning occurs within a social context. SCT has some limitations too. Firstly, its framework for examining the relationships between individual behaviour and the environment is organized irregularly, making it challenging to pinpoint which of that factors are more influential than the other. Secondly, the theory's initial focus on the learning process does not fully account for the role of motivation in driving behaviour. Finally, there is no adequate attention given to the impact of past experience and expectations on shaping behaviour (A. Rahman et al., 2021).

2.4.4 Innovation Diffusion Theory

Innovation Diffusion Theory (IDT) or Diffusion of Innovation Theory (DOI) is rooted in Psychology and has been used to study innovation in different disciplines (Rogers, 1995). IDT framework explains the diffusion of the innovation process and explains why users ultimately choose to adopt or reject an innovation (Hubert et al., 2018). DOI theory proposes five key factors influencing the adoption rate of innovation: relative advantage, compatibility, complexity, trialability, and observability. Relative advantage refers to the perceived benefit associated with the innovation. Compatibility is the extent to which how well the innovation aligns with users existing values, needs and experiences. Complexity focuses on the perceived difficulty of understanding and using the technology, trialability measures the availability of the innovation to be experimented before adoption, and observability refers to the visibility of innovation results to the users   (FakhrHosseini et al., 2022; Rogers, 1995). The theory further interpreted to identify five categories of adopter based on their characteristics; early adopters, innovators, laggards, late majority, and early majority are defined (Sila, 2015). The primary limitation of the DOI lies in its emphasis on the system features, organizational attributes and environmental factors, which results in less consideration given to the unique influences on individual behaviour. Consequently, it is less practical to predict outcomes compared to other adoption models (Taherdoost, 2018).

2.4.5 Technology Acceptance Model

The technology acceptance model (TAM) was developed from the TRA model and was mainly developed for studying user acceptance of ICT systems in organizational settings, where usage is voluntary (Dishaw & Strong, 1999). TAM explains the motivation of users by three factors: perceived usefulness, perceived ease of use, and attitude toward use. In some instances, the TAM

framework is extended to incorporate external variables. These variables may include user training programs, the inherent characteristics of the system itself, and the degree of user participation in the design and implementation stages. This expandable contributes to TAM's position as one of the most widely cited models in technology acceptance research (FakhrHosseini et al., 2022; Taherdoost, 2018). Building upon TAM, Venkatesh and Davis (2000) introduced TAM2. An extended model to include social influence and experience and the cognitive instrumental process leading to the higher explanatory power of 60% regarding user adoption (FakhrHosseini et al., 2022). Later, Venkatesh and Bala (2008) developed TAM3 to further uncover determinants of perceived ease of use and perceived usefulness.

Despite TAM's roots in Psychology, it is not equipped to fully explain variations in individual technology adoption behaviour (Walldén & Mäkinen, 2014). McFarland and Hamilton (2006) acknowledges the following limitations of TAM. They argue that TAM may be too general, which might overlook the influence of contextual factors. Specifically, they pointed out that TAM cannot distinguish between the complexity of the task itself and the complexity of the system used. This can cause users to evaluate the system based on the task difficulty, which questions the accuracy of the research findings.

2.4.6 Unified Theory of Acceptance and Use of Technology

Unified Theory of Acceptance and Use of Technology (UTAUT), predecessor of UTAUT2, is combination of 8 technology acceptance theories: "*TRA, motivation theory, social cognitive theory, TAM, TPB, diffusion of innovation, model of PC utilization, and combined TAM-TPB*" (Venkatesh et al., 2003), it was proposed to address the drawbacks of Technology Acceptance Model (TAM) theory where it failed to address crucial factors like social influence and personal and institutional factors. These factors are considered important to understanding the technology acceptance in personal and institutional contexts. UTAUT identified four key constructs that influence the intention to use (behaviour intention): "*Performance expectancy, effort expectancy, facilitating conditions and Social Influence. Facilitating conditions also impact user behaviour. In addition, four significant moderating variables were identified: gender, experience, age, and voluntariness of use*" (Venkatesh et al., 2003). UTAUT model with social influence factor, demonstrates a high explanatory power in predicting technology adoption behaviour. Research suggests that UTAUT can account for up to 70% of the variance in user adoption decisions (Peek et al., 2014). Below figure (figure 3) is the UTAUT model developed by Venkatesh et al. (2003). In the following section each construct is defined, and the role of moderators is specified.
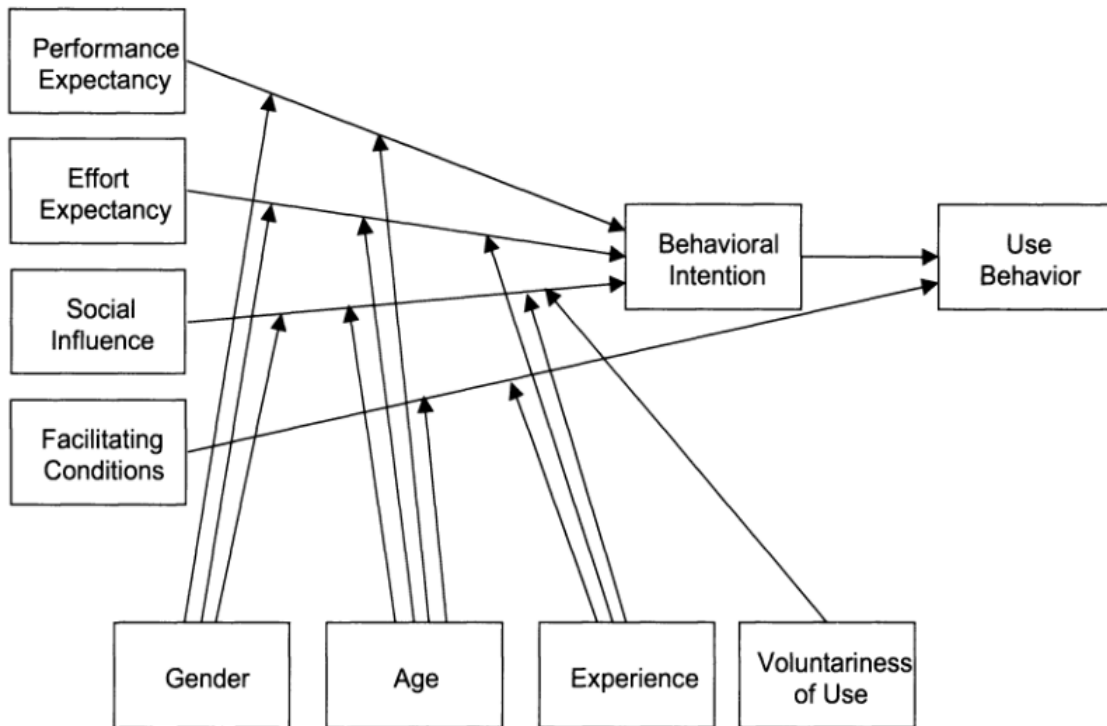
FIGURE 3 UTAUT Framework

Performance Expectancy (PE) is defined as "*the degree to which an individual believes that using system will help one to attain gains in job performance*" (Venkatesh et al., 2003). This concept draws from five constructs across various models: perceived usefulness (TAM/TAM2), extrinsic motivation (MM), job-fit (MPCU), relative advantage (IDT) and outcome expectations (SCT). Their research also suggests that gender and age moderate the relationship between PE and behavioural intention, with a stronger effect observed for young men (Venkatesh et al., 2003).

Effort Expectancy (EE) is defined as "*the degree of ease associated with the use of the system*" (Venkatesh et al., 2003). This concept is derived from three factors identified in existing theories: perceived ease of use (TAM/TAM2), ease of use (IDT) and complexity (MPCU). They also suggest that gender, age, and experience moderate the impact of EE on behavioural intention. Young women, particularly in the early stages of using a new system, may be more influenced by their perception of ease of use (Venkatesh et al., 2003).

Social Influence (SI) is defined as "*the degree to which an individual perceives that important others believe he/she should use the new system*" (Venkatesh et al., 2003). Social Influence is derived from three constructs from existing theories: subjective norm (TRA/TAM2/TPB models), social factors (MPCU) and image (IDT). Their research suggests that factors like gender, age, experience, and voluntariness can moderate the impact of SI on behavioural intention. Notably, the influence of social pressure may be stronger for older women in mandatory settings, particularly when they are new to the system (Venkatesh et al., 2003).

Facilitating Conditions (FC) is defined as "*the degree to which an individual believes that an organization and technical infrastructure exists to support use of system*" (Venkatesh et al., 2003). This construct integrates ideas from prior models: perceived behaviour control (TPB models), facilitating conditions (MPCU), compatibility (IDT). Their research suggests that FC has an indirect influence on behavioural intention. While FC doesn't directly predict intention when Performance Expectancy (PE) and Effort Expectancy (EE) are considered, it can influence actual user behaviour. This effect is particularly strong for older users with more experience, suggesting that robust support systems become more critical as users age and gain experience with a technology(Venkatesh et al., 2003).

Though UTAUT has a comparatively higher probability of explaining adoption, it was developed in the organization context. Venkatesh et al. (2003) proposed UTAUT to understand the technology adoption among employees within the organization, similar to other technology adoption models and theories. Unlike consumer markets where technology use is optional, UTAUT recognizes the mandatory nature of technology acceptance in organizational settings. So to understand the adoption in the consumer context Venkatesh proposed UTAUT2.

2.4.7 Unified Theory of Acceptance and Use of Technology 2

UTAUT was later extended to the UTAUT2 model which was proposed as a useful model to understand consumer use of technologies in general. In UTAUT2, few more constructs like hedonic motivation, price value and habit were added. Additionally, the moderators like age, gender and experience were theorized to moderate various relationships (Venkatesh et al., 2012). This UTAUT2 model is shown in the below figure (figure 4).

Hedonic Motivation (HM) is defined as the "*fun and pleasure derived from using a technology*" (Venkatesh et al., 2012). Venkatesh (2012) recognized the importance of HM in consumer technology acceptance. Building on prior research, he integrated HM as a new construct within the UTAUT2 model, acknowledging its established role as a key determinant of consumers behavioural intention in adopting technology.

Price Value (PV) is defined as the "*consumers cognitive trade-off between perceived benefits of technology applications and the monetary cost for using a technology*" (Venkatesh et al., 2012). Venkatesh introduced the PV construct because, unlike organizational settings where users often bear no financial burden, consumers directly pay for the technology or system. Venkatesh et al. (2012) proposes that a positive price value, where the perceived benefits outweigh the cost, is more likely to lead to technology adoption. In other words, users must believe the technology offers advantages and usefulness that justify the money spent. Venkatesh et al. (2012) also proposed that age and gender moderate the impact of price value on behavioural intention. Notably, the influence of a positive price value may be stronger for older women.
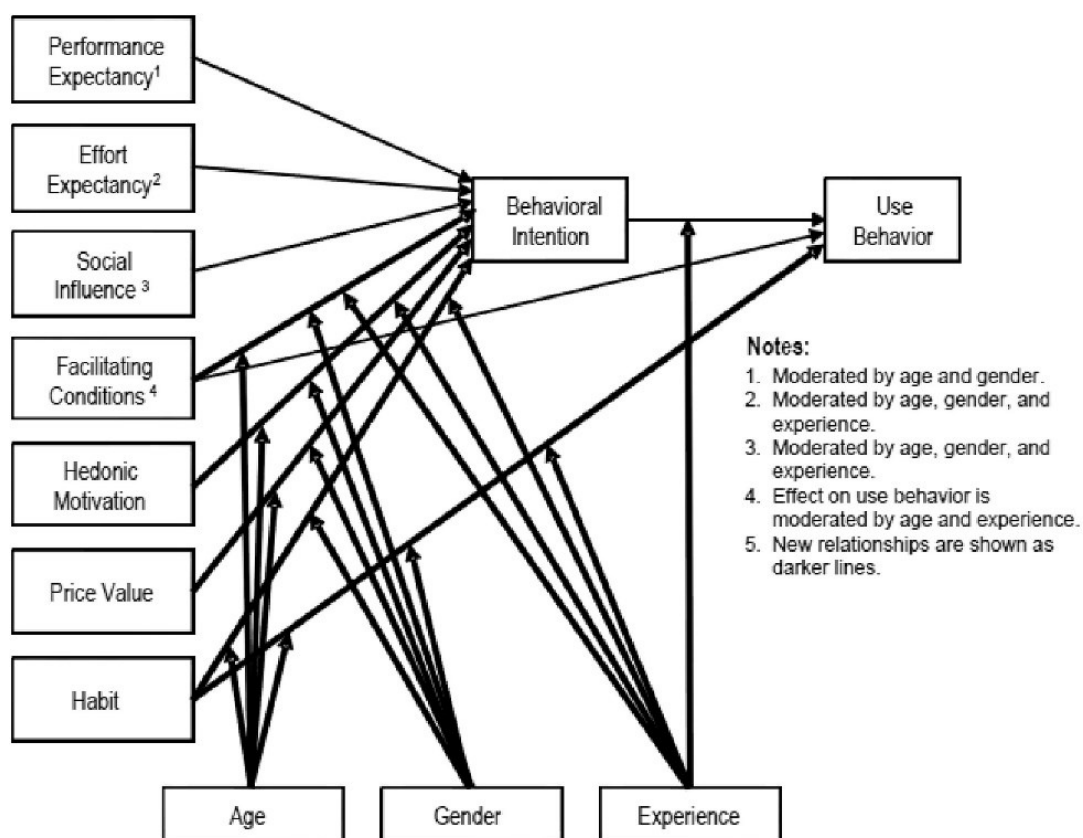
FIGURE 4 UTAUT2 Framework

Habit is defined as "*the extent to which people tend to perform behaviour automatically because of learning*" (Venkatesh et al., 2012), Habit is portrayed in two ways by Venkatesh. First, it has a direct influence on use behaviour and second, it influences use behaviour through behaviour intention. So that strong habit will eventually lead to strong BI that in turn will influence use behaviour. Another change made in UTAUT2 was the exclusion of the moderating factor of voluntariness to make it applicable in the consumer context. Because consumer behaviour is voluntary unlike in organizational settings where voluntariness can vary from absolute voluntary to absolute mandatory.

Most of the Technology adoption studies are done through theories of TAM and UTAUT (Peek et al., 2014). A comparative study by A. Rahman et al. (2021) on technology adoption models highlights UTAUT2 as the most comprehensive framework for understanding consumer technology adoption and usage. This research emphasizes UTAUT2's pivotal role in technology acceptance research. The model provides a robust foundation for analysing why consumers accept or reject new technologies, offering valuable insights into their specific perspectives. Especially in the context of factors impacting the technology acceptance, previous studies prefer UTAUT and it extended model UTAUT2.

2.5 Previous FinTech Study Using UTAUT2

In the context of the present research, UTAUT2 emerges as the suitable model, as numerous instances showcase its utilization as a theoretical framework for assessing technological acceptance among the elderly including mobile-based payment acceptance. For instance, a study conducted by Macedo (2017) utilizes UTAU2 model to study the acceptance and usage of ICT among senior citizens. Another study conducted by Arenas-Gaitán et al. (2015) explored and explained internet banking usage among the elderly in Spain using the UTAUT2 model.

Although theories are designed to measure user acceptance and satisfaction with new technologies, they vary in focus based on the specific constructs or determinants they consider (Momani & Jamous, 2017). This is why authors often modify the UTAUT2 model, either by including other technology acceptance methods or by adding specific factors pertinent to their particular research field. Moreover, the original authors themselves recognize the need for future research endeavours to explore and integrate potentially influential constructs specific to various research contexts, with the ultimate aim of enriching the UTAUT2 model (Venkatesh et al., 2012). For instance, Baabdullah et al. (2019) studied the acceptance of mobile banking in Saudi Arabia using the UTAUT2 model and merged it with D&M IS Success model to include the 'Quality Aspects' and how it impacts the acceptance of M-banking in the context of Saudi Arabia. Similarly, in the context of India, there are few existing literatures that utilizes modified UTAUT2 model to investigate technology acceptance, including mobile banking adoption. Sankaran & Chakraborty (2022) study contributed to existing literature by identifying 'Relative Advantage', 'Add-on Services' and 'Promotional Benefits' as additional constructs apart from the existing UTAUT2 constructs. Research done by Saha & Kiran (2022) incorporated 'COVID-19' as an additional construct to the existing UTAUT2 model to study UPI adoption, focusing on baby boomers born between 1944 and 1964. However, this study lacks explicit mention of respondent's ages, providing a broad statement that the recipients fall within the age range of 50 to 75 years without specific age groupings. Despite that, this research contributes to the existing technology acceptance literature by proposing and validating a novel relationship between the impact of COVID-19 and the behaviour intentions of baby boomers to embrace UPI. Moreover, the study challenges the stereotype that baby boomers resist technology adoption or are inclined to stay away from it.

This UTAUT2 framework's adaptability allows researchers to tailor it to the study context. This gives the author the freedom to add or remove additional constructs depending on the research question. In the current realm of this research, we aim to explore deeper into senior citizens perspective of UPI and factors impacting the acceptance. Since UTAUT2 focuses on user behaviour after system adoption, constructs like 'Use Behaviour' are less relevant to our

study which explores initial acceptance. Therefore, for this qualitative research we only utilize some of the UTAUT2 constructs as guiding framework. In the following methodologies section, we provided comprehensive information on the chosen construct and how these constructs will be applied.

3 RESEARCH METHODOLOGY

This chapter provides an overview of the research paradigm, research context, research framework, methodology, participants, and tools utilized to gather the necessary data to investigate the research objectives.

3.1 Research Strategy

A research strategy is essential as it directly influences how we collect the data, interpret it, and consequently answer the research questions. Researchers choose the most suitable approach after understanding the research question and conducting a comprehensive analysis of the research context, including prevalent practices and norms within the field.

Given the nature of the phenomenon of the current study, which is exploring the senior citizens perspective on UPI an explanatory qualitative research approach is suitable. This study's primary goal is to accumulate comprehensive data, which facilitates a deeper understanding of the factors influencing senior citizens adoption of UPI. Consequently, qualitative research emerged as the best suitable approach since this methodology not only allows participants to narrate and interpret their experiences with UPI, but also to explore their perceptions of potential future experiences with the technology (Ochieng, 2009).

A quantitative research approach, generally distinguished by its emphasis on closed-ended collection of data, is deemed inappropriate for this study due to its major focus on confirming hypotheses. Also, a mixed-method approach, which includes both qualitative interviews and quantitative surveys, is deemed unsuitable for our research. This decision is based on the inherent complexities of data integration in mixed methods research. Merging qualitative and quantitative datasets and drawing conclusions from them is a significant challenge (Haq, 2015), especially considering the limitations on resources and time availability for this study. Therefore, a qualitative study is best suited to achieve a

deeper understanding of senior citizens perspectives on UPI, rather than a broader view through a mixed methods approach (Ochieng, 2009).

Another rationale for choosing the qualitative research approach stems from the unique benefits that the qualitative data collection method provides. In contrast to quantitative research, which employs larger and more random samples, qualitative interviews utilize a concise and purposive sampling approach (Merriam, 1998). This purposive sampling strategy, increases the descriptive richness of interview data, allowing for a more in-depth investigation of individual opinions. This depth of insight is necessary for a comprehensive understanding of intricate interactions that exists between technology acceptance and the unique needs of older individuals in this context.

3.2 Theoretical Framework

The purpose of this research is to understand the perspective of senior citizens regrading UPI and to identify the barriers hindering their adoption. To unravel this phenomenon, our study utilizes seven UTAUT2 constructs as framework. These constructs serve as themes for developing interview questions. Below figure (figure 5) illustrates the adopted framework for this study. Behavioural intention lies at the heart of this model, to uncover senior citizens intention to adopt and use UPI. This model will help us uncover both the factors that motivate them to adopt UPI and the barriers that hinder their adoption.

Performance Expectancy: This theme focuses on their general perceptions of UPI and potential reservation about using UPI.

Effort Expectancy: This theme explores the perceived ease or difficulty of using UPI among senior citizens. It explores the challenges they encounter in learning and using the technology while also encompassing an examination of their broader experience with technology. Additionally, delves into their comfort level using smartphones and identifies any particular aspect of UPI that they perceive as complex. It also involves exploring their preferred methods of payment and the frequency of their transactions.

Social Influence: This construct examines the influence of social circles on senior citizens perception of UPI. It examines how the opinions and experiences of family, friends or fellow seniors might impact their decision-making process.

Facilitating Conditions: This theme focuses on what resources and support are available to assist seniors in using UPI from their perspective. It also examines what kind of help and support they might need from families, financial institutions, and policy makers.

Hedonic Motivation: This theme focuses on the motivational factors that will incentivize senior citizens to adopt UPI. It explores how external factors, such as monetary incentives, will influence their decision-making process.

Price Value: This theme will explore the perceived costs associated with UPI, including financial and non-financial costs. It will explore the concerns

regarding data charges and transaction fee as financial cost, while also investigating non-financial costs such as time and effort required to learn and use UPI.

Habit: This construct examines how senior citizens existing financial habit influences and their perspective towards UPI.
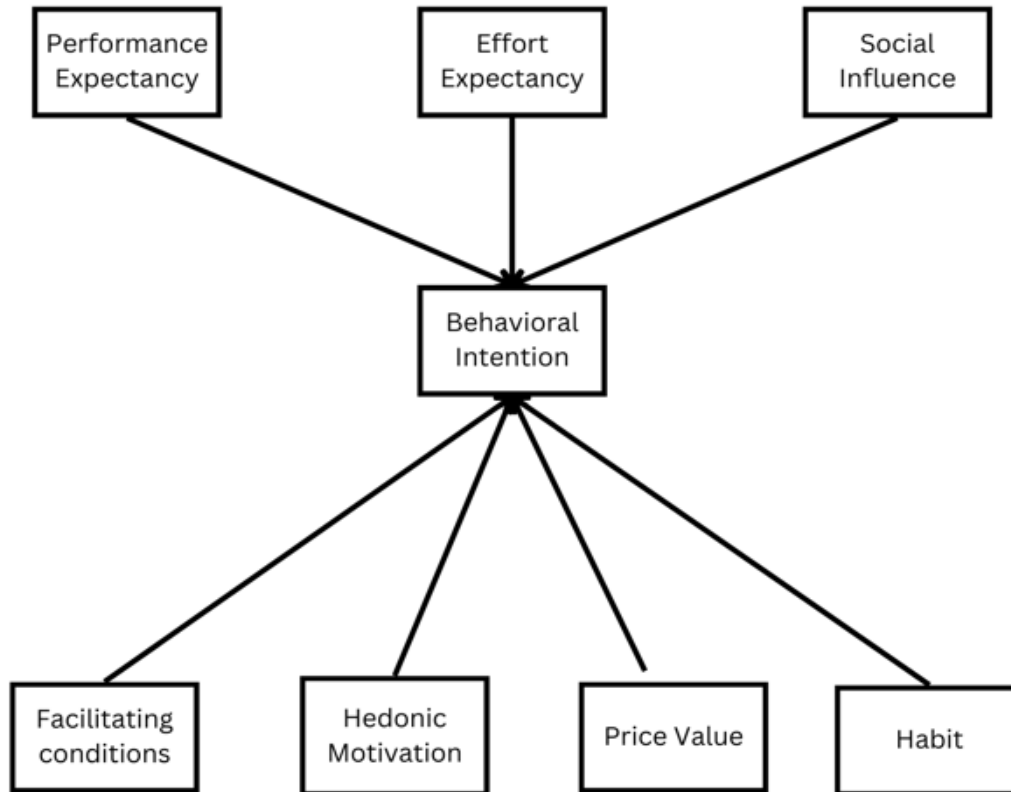
FIGURE 5 Theoretical Framework

By examining these critical themes, developed from UTAUT2, and applying them to the specific context of senior citizens, this research seeks to unveil comprehensive insights into the factors influencing their decision-making process regarding UPI adoption.

3.3 Data Collection

In qualitative research method interview is the most common and one of the most significant data gathering tool (Englander, 2012). Qualitative interviews are an effective tool for exploring the nuances of individual opinions through the richness of their language, in contrast to the numerical data that are typically used in quantitative approaches (Mason, 2010). According to Merriam (1998), when a study seeks to explore 'why' and 'how' questions, qualitative research is considered a more suitable method. This method is also appropriate when participants had a low level of awareness of the subject or when there were issues

that participants were not used to talking about, such as values, intentions and ideals (Åstedt-Kurki & Heikkinen, 1994).

Myers and Newman (2007), categorize five types of qualitative interviews commonly employed in academia: structured interview, semi-structured interview, group interview, themed interview, and unstructured interviews. Within the framework of this study, we employ a semi-structured interview format, while also maintaining an open flow of conversation. This approach permits interviewer to improvise follow-up questions based on participant's responses (Rubin & Rubin, 2011) and allows participants to express themselves. This interview format facilitates for a thorough analysis of participant's points of view and elicits detailed replies to the topics addressed. The information gathered is particularly useful in the context of this study.

3.3.1 Interview

Following the purposive identification of a small number of willing respondents, an invitation for the interviews were sent. Face-to-face interviews hold potential advantages for data collection in this study, however time constraints and unavailability of travel grant necessitated the adoption of online interviews. We employed the online video conferencing platform Zoom for conducting interviews. This platform's recording capabilities enabled the capture of interviews for later transcription and analysis. This approach fostered a more relaxed and familiar environment, potentially leading to increased trust between the interviewer and interviewee. The virtual interview approach was chosen to promote an open and candid exchange of thoughts, to create an environment where they feel at ease and are encouraged to freely express their opinions and perspectives.

The Interviews were conducted in Tamil, the interview questions were formulated based on the themes developed from UTAUT2 constructs and the questions were translated from English to Tamil using a translator also the correctness of the translation was checked through cross verifying with two other persons who had good command over both the languages.

We initiated the interview with an introduction statement highlighting the research objectives to the participants. This involved underscoring the commitment to privacy and the preservation of anonymity concerning their identities. Following this, a detailed explanation of UPI was presented. While the planned language of the interview was Tamil, participants responded using a combination of English and Tamil expressions. The adoption of this multilingual communication strategy was intended to accommodate the participants' language preferences, guaranteeing maximum clarity and comprehension throughout the interview process.

3.3.2 Questions

Interview questions were framed on the themes mentioned in the theoretical framework. Considering the interview model is a semi-structured interview most of the time the questions were restructured and presented in informally. Since this line of questioning was probing enough to get more information from the recipients. An overview of the interview questions is shown in the appendix of the study (see appendix 1).

The questions were initially formulated in English; however, due to the study being conducted in Tamil Nadu, they were translated into Tamil. The translation process involved collaboration between the researcher and a professional translator, who is a schoolteacher and is proficient in both English and Tamil. Following a meticulous analysis of the translated iterations, a definitive version was established. This final version underwent another round of translation from English to Tamil to ensure consistency between both language renditions. The final translated version of the Tamil questionnaire was paraphrased during the interviews. This adjustment was made as the interviewees demonstrated greater confidence with informal tones and dialects within the language. Furthermore, the mirroring technique was employed during interviews, which involves asking follow-up questions that reflect back on the participant's responses. This approach goes beyond a pre-determined set of questions, allowing for exploration of topics that arise naturally during the conversation. This approach promotes a reciprocal dynamic between the interviewer and the participant (Galletta, 2013), which increases the depth and complexity of the qualitative data acquired.

3.4   Research Participants

The research participants were selected from the Indian state of Tamil Nadu, adhering to specific criteria. The key selection criterion for research candidates includes possessing basic literacy skills to read and write in their native language and regularly using smartphones as part of their daily routine. Respondents should also possess an active bank account which they access for their financial needs.

The participant selection process was confined to Tamil Nadu due to the prevalent language barrier among senior citizens. Given India's multilingual landscape and most senior citizens preferring communication in their native tongue, the decision was made to focus recruitment efforts on Tamil Nadu. Our fluency in Tamil and status as natives of the region facilitated participant recruitment and rapport-building. However, as the interview phase progressed, we faced difficulty with finding interview candidates. Individuals either lack interest in participating in the interview or were unwilling to share their personal banking preferences with a stranger. To overcome this obstacle, I reached

out to my connections and acquaintances, providing an overview of my research objective and seeking their assistance in identifying potential respondents who not only met the research requirements but also had a genuine desire to take part and express their opinions. This extensive outreach effort, however, was met with several rejections before identifying a small number of 17 individuals eager to participate in this study. This iterative approach highlights the methodological complexities and patience necessary in navigating participant recruitment, particularly when dealing with sensitive subjects like personal finance. The sample sizes for qualitative studies are generally smaller than quantitative studies, and in many cases, as few as 10 participants are needed to reliably accomplish the aim of a study (Mason, 2010). The interviewees for the research encompass a diverse range of backgrounds and professions, including retired government employees, healthcare workers, teachers, entrepreneurs, and homemakers. An overview of participants profile is provided in the appendix section (appendix 2).

The duration of the interviews ranged from 15 to 40 minutes, averaging around 30 minutes per interview. On average, the interview transcripts spanned approximately 4 pages each without the introductory comments. Respondent's insights provide a multifaceted perspective on the factors influencing UPI adoption among senior citizens.

3.5   Data Reliability and Validity

Data reliability is the process of evaluating the research credibility to ensure the applicability and the replicability of study's findings (Ahmed & Ishtiaq, 2021). Ensuring the credibility of qualitative research differs from quantitative research because they measure different things. The credibility of quantitative research depends on the instrument construction, whereas in qualitative research, the researcher is the instrument (Patton, 2001). Patton (2001) argues that when organizing a study, analysing the findings, and assessing the study's quality, validity and reliability are two aspects that any qualitative researcher should be thinking about. Qualitative research quality is related to the generalizability of the results, which tests and increases the research's validity or trustworthiness. Although the ability to generalize findings to wider groups and circumstances is one of the most common tests of validity for quantitative research, the researcher uses methods like triangulation methods to test the reliability and validity of the research (Golafshani,2003). Patton (2001) advocates the use of triangulation by stating "*triangulation strengthens a study by combining methods. This can mean using several kinds of methods or data, including using both quantitative and qualitative approaches*". However, due to the nature of combining different methods it is time-consuming. Moreover, there is a possibility of results being inconsistent since data from different sources may contradict one another.

According to Chetty (2020) several criteria for establishing the credibility of qualitative research, including refutational analysis, comprehensive data utilization, continuous testing and comparison of data points, and the inclusion of deviant cases. To ensure the credibility of our findings, we employed some of these strategies throughout the research process. Firstly, we implemented a well-documented data collection process, detailed in the preceding section. This transparency allows readers to assess the potential for bias and the overall strength of the data foundation. Secondly, the data analysis section will provide a thorough breakdown of the analysis process. This detailed account serves to enhance the validity and reliability of our conclusions. Finally, we maintained meticulous attention to rigor throughout the qualitative analysis. This commitment to methodological rigor strengthens the trustworthiness of our research.

3.6   Data Analysis

Qualitative analysis is the process of extracting viewpoints from interviews for the researcher to understand the phenomenon under examination (Ochieng, 2009). This intricate process involves various levels of analysis facilitated by tools and functions, as detailed in the figure presented below. It provides a closer examination of methods and functions employed in the analysis, shedding light on the comprehensive method used to unfold and interpret the gathered data to answer the research questions.

The analysis is done at the level of words, at the level of codes, at the level of concepts and the level of memos. Tools for word-level analysis encompass word lists, document overviews, keyword-in-context lists, and matrices. At the code level, tools include lists of codes with frequencies, code location overviews, and matrices showing code concordance. Concept analysis involves tables, schemes, and matrices representing document-specific concept references. The fourth level addresses researcher-written memos, such as concept, profile, method, and theory memos. Analysing data can occur at various levels, and the tools discussed are not universal. In qualitative analysis, researchers often create their tools based on the questions or challenges they encounter. A researcher does not need to work on all four levels to conduct a thorough analysis; it will depend on the particular research topics. (Peters & Wester, 2007).

The analysis method used for this research is thematic analysis. The thematic analysis aims to identify important subjects or themes in the collected data. The method begins with recognizing and categorizing these themes, which allows for a more in-depth examination of the phenomenon. Thematic analysis was chosen as the method for this research since the interview questions were formed from the themes of UTAUT2 constructs. Aronson (1995) in his study '*A pragmatic view of thematic analysis*' lists outs the following steps essential for thematic analysis: The first step of thematic analysis involves listing patterns of experience from the transcribed conversation, which could be done through direct quotes or paraphrasing the text. The following step involves

identifying all data corresponding to previously classified patterns. Subsequently, related patterns are merged and organized into sub-themes, and during this process, additional patterns may emerge, providing a more comprehensive understanding of the data. Finally, we must provide a valid argument for choosing the themes, which can be accomplished by reading related literature. Once the themes are identified and the literature is reviewed the researcher is to formulate theme statements to develop a story line.

For the data analysis we utilized the Computer Aided Quality Data Analysis Software (CAQDAS) to analyse the data, which helped to decipher the interview text. This allowed for the examination of subtle themes and subthemes within the transcripts, ultimately contributing to the development of comprehensive findings. The chosen CAQDAS for this research is ATLAS.ti version 23, primarily for its ability to facilitate rigorous qualitative analysis and interpretation. Moreover ATLAS.ti version 23's AI coding feature enhances the coding process allowing for more efficient data organization and analysis. This feature further facilitates the rigour of the research.

The initial stage involved cleaning the transcripts for any punctuation or grammatical errors to ensure data accuracy for subsequent analysis. Following this the transcripts were read and re-read for familiarization of the content. We then uploaded the content to ATLAS.ti analysis tool. While the tool's AI-powered auto code generation feature has generated 300 plus codes for the 17 transcripts, this volume proved excessive for efficient analysis. Therefore, following Braun and Clarke's (2006) guidelines for coding, we manually refined the codes, reducing the number to manageable 100 plus codes with 60 plus quotes. A secondary manual coding process further condensed the codes and quotes to 60 and 50 respectively.

The research focus then shifted from initial codes to finding themes (Braun & Clarke, 2006) enabling to identify main themes and sub-themes. For instance, two initial codes "fear of financial loss" and "financial anxiety" were combined to create sub-theme "fear". Following further review and refinement, the sub-theme "fear" was ultimately renamed "anxiety" due to the inclusion of additional codes like "fear of making mistakes," "fear of trying new things," and "technology anxiety." Braun and Clarke's (2006) naming guidelines were utilized while reporting the findings to ensure clear and consistent terminology throughout the research. The merging of the sub-themes "ease-of-use" and "convenience" into "perceived usefulness" during the reporting stage exemplifies this approach. This consolidation strengthens the storytelling narrative by illuminating the interplay between these concepts within the participants experiences. By providing a detailed breakdown of the analysis process, we enhance the credibility, rigor, and replicability of the analysis. It allows other researchers to potentially replicate the study within the same setting and assess the generalizability of our findings.

4 FINDINGS

This section presents the results of this study, focusing on the factors influencing senior citizens intention to adopt and factors influencing their non-adoption of UPI.

4.1 Factors Influencing Senior-Citizens Intention to Adopt

In this section, we present the factors influencing senior citizens intention to adopt UPI for their financial transactions.

Social Influence

Senior citizens often express their desire to adopt UPI because they are motivated by individuals in their social circle. These influencers include their children, friends, family members, and even vendors or workers they interact with in their daily lives. For instance, one respondent recounted an encounter with a vegetable vendor who suggested using Google Pay (an UPI interface) for easier transactions, he says:

> *When I go to the local market to buy some vegetables for, say Rs. 23, they will not have the necessary change when I pay in cash. Vegetable vendor asks me, 'Why don't you use Google Pay and finish it off easily?'* (Interviewee #6)

This interaction with the vendor influenced him to consider adopting UPI, which he is planning to adopt very soon.

> *So, I have been telling my vendor that I will start using it very soon.* (Interviewee #6)

Moreover, social influence extends beyond friends and family to include neighbours who advocate for the adoption of digital banking technologies. One

respondent mentioned being encouraged by his neighbour to adopt UPI, emphasizing inefficient infrastructure in the country which is not tailored to the needs of older adults.

> *Even my neighbour, an Engineer by profession, tells me to adopt mobile banking stating that standing in queue is waste of time and there is no proper infrastructure for elderly.* (Interviewee #7)

Such interaction emphasises the role of peer influence in shaping senior citizens attitude towards UPI. Similarly, another respondent describes feeling left out when unable to participate in the digitalization in the religious setting which gives them a sense of motivation to learn and adopt such technologies.

> *When I go to temples, the priests sometimes ask me to send money through G-Pay for certain rituals, and I have to say "Sorry, I do not use it." It makes me feel kind of left out and sad.*
>
> *I feel like I should learn it soon. Learning new things is always good, whether using it or not comes secondary.* (Interviewee #14)

Furthermore, participants feel that society is shifting towards digital banking, and they feel compelled to learn and adopt such novel technologies to avoid being left out. Consequently, they express their willingness to learn and adopt with the support of their children.

> *With the day-to-day advancement of technology, I too feel that someday I should start using it to avoid being left behind in the ongoing developments. I believe it's time for me to start learning and using them, with help of my children* (Interviewee #17)

In essence, social influence plays a pivotal role in shaping senior citizens attitude and intention towards the adoption of UPI, highlighting the importance of peer recommendation which is driving this demographic towards UPI.

Family Support

Almost majority of the senior citizens established their desire to learn UPI. They prefer to do so with the support of their children rather than seeking help from an unknown stranger. This preference is rooted in the trust they place on their family members, one participant says:

> *If a reliable person like my son or someone close to me helps, I might be willing to give it a try. I would prefer that it's someone I trust, like my son, rather than a stranger or unknown person.* (Interviewee #2)

Another participant echoed the same,

If my children teach and support me, I will start using G Pay (Interviewee #12)

Moreover, the senior citizens emphasise on importance of having their children present during the learning process to ensure a seamless transition towards UPI.

I'll ask my children to be by my side when I do it to make it foolproof and eliminate any chances of mistakes. (Interviewee #14)

The role of children in facilitating UPI adoption is underscored by the practical assistance they provide in teaching and supporting their parents. One participant credited their son with teaching them how to use UPI, indicating a gradual transition towards independent usage. They remarked,

My son has actually taught me how to use it. If I am serious about using it, then I can slowly start doing so without any issues. (Interviewee #16)

The willingness of senior citizens to adopt UPI for their financial transactions depends on the support and guidance offered by their children, highlighting the crucial importance of family support in technology adoption of this demographic.

Perceived Usefulness

Senior citizens see UPI as a valuable technological innovation that promises benefits for them in transitioning to a cashless system, which they consider a secure and convenient option given their age and associated mobility challenges. The following respondents illustrates the simplicity and user-friendliness of UPI and acknowledge it as a positive technological advancement recognizing its utility for people from all backgrounds.

It's certainly useful for people from all walks of life. (Interviewee #9)

It is a positive advancement in technology. (Interviewee #1)

The steps for using UPI are straightforward and user-friendly. (Interviewee #6)

One respondent emphasizes the convenience of UPI particularly while traveling, emphasizing its secure nature.

It is certainly useful and beneficial. Even when I travel, instead of carrying cash securely, if I just carry my phone, it becomes convenient. (Interviewee #16)

Moreover, the respondent compares UPI with other digital platform like YouTube to underscore the usefulness of UPI.

> *I find this technology very beneficial compared to YouTube, which we only use for watching videos.* (Interviewee #16)

The convenience factor of the UPI is aptly summarized by the following respondent who recounts the instance where they seriously considered adopting UPI after witnessing how easy it was to send money to distant location.

> *Sometime ago, I sent money to someone in Tiruvannamalai* [a town located about 120 kms from respondent town] *using my relative's help through his G Pay account. I strongly felt the need to learn and use it myself, witnessing how easy it was.* (Interviewee #14)

Additionally, same respondent emphasises the safety and convenience of UPI for various transactions, including online purchases:

> *I know this is the easiest and safest method to handle money, even for buying groceries online which are home delivered. No doubt this is the simplest and safest option.* (Interviewee #14)

Senior citizens perceive UPI as useful tool highly beneficial and advantageous technology that enhances convenience, efficiency, and security in financial transactions, and their preference to adopt UPI for their usefulness.

Compulsion

During the interview many respondents expressed that a government mandate for UPI adoption could influence their decision to adopt it. They emphasised that compulsion would incentivize them to learn and use the technology for their transactions. One of the respondents expressed their belief that when the government makes it compulsory for specific tasks, especially for pensioners, could facilitate its widespread adoption.

> *In my opinion, government could even make it compulsory for them* [referring to the pensioners] *to use UPI and withdraw cash only when it's necessary for some specific purpose.* (Interviewee #13)

And this view resonated with the other senior citizens citing that the lack of compulsion as a reason for their non-adoption of UPI.

> *If it becomes mandatory, then I might consider learning.* (Interviewee #1)

Similarly, another respondent expressed the inevitability of compliance if UPI were to made compulsory.

If this is compulsorily implemented, we will certainly learn and start using it. That time we cannot refuse it. (Interviewee #8)

Finally same opinion is echoed by another respondent who says compulsion would transform UPI from an option to necessity, promoting its adoption.

If the government makes it compulsory, that is, if we have to use UPI for all transactions, then it becomes a necessity, and we will start using it. (Interviewee #9)

The prospect of compulsion by the government emerged as a significant factor that would encourage senior citizens to adopt UPI, underscoring the role of government mandate in technological adoption.

4.2 Factors Influencing Senior-Citizens Non-Adoption of UPI

In this section, we present the factors impacting the adoption of UPI among senior citizens in India. We are splitting the challenges into two segments which are User-Centric and Technology-Centric challenges.

4.2.1 User-Centric Challenges

Participants conveyed following user centric challenges that prevents them from adopting UPI for their financial transactions.

Low Perceived Self-Efficacy and Anxiety

Senior citizens often exhibit apprehension towards embracing UPI, with a prevalent fear centring around the prospect of making errors. For many, this apprehension is deeply intertwined with the fear of financial loss.

Even though it's convenient, I am scared that I might commit some mistake and money will go to some unknown person. (Interviewee #9)

This sentiment echoes among others, as highlighted by another participant's concern:

I'm afraid since it involves money. If I mistakenly send it to the wrong account, I will lose my money. (Interviewee #16)

The concern surrounding the potential for irretrievable loss intensifies the fear of financial loss associated with UPI use. This anxiety is further amplified by a generally low perceived self-efficacy among senior citizens. They often express worry about making mistakes while using the app, which could lead to

unintended transfers of funds. This apprehension aligns with the concept of fear of novelty, where individuals exhibit a reluctance to adopt new technologies due to security anxieties.

> *Firstly, there's a fear of trying new things, concerns about security issues like possibility of someone manipulating and misusing it. These are the biggest fears and reasons.* (Interviewee #8)

Recipients attribute their low perceived self-efficacy to multiple factors, prominently citing the lack of knowledge and awareness.

Lack of Knowledge and Support

Senior citizens find themselves excluded from the technological advancements surrounding UPI, primarily due to a lack of adequate awareness and support from governmental and banking authorities.

> *It's because I don't have proper knowledge about that, and nobody explained about this so I cannot use it.* (Interviewee #2)

Moreover, the lack support from the children exacerbates the situation. One of the Interviewee shares that younger generation are discouraging older adults from adopting such technologies.

> *Younger generation nowadays often discourages older adults from embracing new technologies and facing challenges. They advise them to avoid trying new things at their age and just stay home to avoid unnecessary risks. They discourage the elders.* (Interviewee #13)

This sentiment is echoed by Participant #11, who recounts their daughter's discouragement:

> *I have a desire to learn and use it. In fact, I once asked my daughter to teach me how to use this app. But she said, "It's very difficult for you to learn and remember all these things at your old age. You might make mistakes and end up losing money".* (Interviewee #11)

Senior citizens are visibly dissatisfied with the apparent lack of assistance and education programs from the government and banks. Participants frequently voice their frustration over the insufficient efforts directed towards educating and empowering this demographic segment of the population. As one participant articulated:

> *Of course, they* [referring to the government and banking sector] *have to provide necessary help and support and educate them on how to use it.* (Interviewee #13)

Calls for action resonates among the senior citizen segment, urging the government and banks to take proactive measures to address this lacking support. One participant advocated for educational programs and extensive awareness raising campaigns that are similar to those of telecom companies' ad campaigns.

> *The government should take some action. Additionally, banks need to step up and educate both the public and their customers. Just like how telephone companies advertise their plans to increase awareness, if government also advertise to general public about this initiative, it will raise our awareness right? This will also increase the adoption of it.* (Interviewee #2)

In essence, there is a critical need for concerted efforts from governmental and banking institutions to bridge the educational gap and facilitate the integration of this demographic into the digital financial landscape.

Age-Related Factors and Dependency

Another concern that emerged prominently during the discussion was age-related factors, with participants highlighting issues such as memory concerns and physical impairments associated with aging. Many senior citizens expressed apprehension about potential mistakes attributed to their health factors, particularly memory issues, impaired visibility, and physical limitations such as trembling hands and legs. Memory concerns, in particular, emerged as a significant barrier to their non engagement with the UPI.

> *It's due to the age factor, as I tend to forget at times. Because of neuro problems associated with my age, there's a chance I might accidentally type the wrong number instead of the intended one. If I enter the wrong number, the money will go to someone else's account. That's why I choose not to use it.* (Interviewee #1)

Participants often cited age-related medical concerns as the primary reason for their reluctance to adopt UPI.

> *Because of my age, my brain's processing speed has slowed down, and I also have some hearing issues. This makes me worried about engaging in digital transactions.* (Interviewee #2)

Moreover, participants highlighted their dependency on family members for both financial support and assistance with health-related matters. Financial reliance on spouses and children was a prevalent theme, with many expressing that their family members handle their expenses.

I can only use such apps if I get some money to my bank account, I don't receive any such amounts. I'm dependent on my husband and children for my financial needs. (Interviewee #11)

This dependency on family members diminishes the perceived necessity of UPI, as their financial needs are already being managed by their family.

Furthermore, senior citizens described entrusting their financial transactions, to their children and grandchildren. They even provide their ATM cards and bank details to family members and request them to perform transactions on their behalf.

Earlier I used to visit the bank personally for transactions, but with the debit card, I do not visit the bank nowadays. My grandchildren withdraw cash and give it to me; I haven't seen the debit card also. (Interviewee #5)

It also involves UPI transaction. One participant shared:

My daughters and granddaughters are already using it. If I need their help with some payment, I will ask them to do it for me, and hence I do not feel it's necessary for me to do it. (Interviewee #4)

This reliance on family members further underscores the intergenerational dynamics influencing senior citizens' adoption of digital financial technology.

Security and Trust

Security and Trust acts as a barrier for senior citizens, towards adoption of UPI. These concerns primarily stem from the fear of potential financial losses due to fraudulent activities.

We fear that our account could also be hacked, and we are unsure if there are chances of forgery in this app. (Interviewee #3)

This pervasive fear of security breaches is largely fuelled by media reports detailing incidents of fraud and hacking within the subcontinent. Participants often cite exposure to such news as a significant factor eroding their trust in digital payment technologies. For instance, one respondent remarked,

We hear about so many account hacking cases in the newspaper and on TV news. We fear that our account could also be hacked, and we are unsure if there are chances of forgery in this app. (Interviewee #3)

The lack of trust in UPI technology further exacerbates the resistance to its adoption among senior citizens. Many express a profound skepticism towards digital payment methods, which is their reasoning opting for traditional banking practices. For instance, one participant stated,

I do not trust these digital payment methods. I will always visit the bank personally and withdraw cash using my cheque only. (Interviewee #7)

Similarly, another participant also voiced:

I don't have faith and trust in this technology. Nowadays, the elderly are getting scammed in many places. So, I feel cash transactions are the best for us. (Interviewee #2)

Additionally, seniors often associate a sense of security with physical cash, viewing it as a tangible asset that provides them with a greater sense of control. As expressed by one participant,

I feel more secure when I have physical cash with me, which I find helpful. (Interviewee #1)

4.2.2 Technology-Centric Challenges

Some respondents conveyed following technology and UPI app-centric challenges that prevents them from adopting UPI for their financial transactions.

Complaint Handling

Respondents often expressed dissatisfaction with the complaint handling services provided by the FinTech companies and banks, citing inefficiencies and complexities in the process. They also highlighted the challenges faced by senior citizens in traversing the app and promptly raising and resolving complaints, emphasizing a simpler and more efficient procedure that are older adult friendly.

One of the recipients points out the difficulty senior citizens encounter in raising complaints promptly,

Raising a complaint promptly without any delay is challenging for older individuals. (Interviewee #1)

This highlights the accessibility issues seniors may face when navigating complaint processes.

Another respondent calls for an easy process for rectifying wrong transactions, suggesting that there should be a straightforward mechanism for getting money back instantly in case of errors.

Even if, by mistake, a wrong entry is done, there should be an easy process of getting the money back instantly. (Interviewee #10)

Interviewee #6 suggested that banks establish a dedicated helpline to improve the existing complaint handling system. They note that while such helplines exist, their implementation falls short of expectations due to high demand and inefficiencies.

> *I think the bank should have a dedicated helpline. Currently, they do have a system like that, but the implementation is not up to the expected levels because of more people trying to avail this assistance.* (Interviewee #6)

Additionally, another respondent highlighted the importance of clear instructions for filing complaints about wrong transactions. They express a clear guidance on rectifying a wrong transaction would alleviate their hesitancy towards UPI.

> *Also, they should provide clear instructions on how to raise a complaint if they make a wrong transaction. If we make a mistake, we should also know how to rectify it, right? That's why people are hesitant to accept it.* (Interviewee #2)

Another respondent expresses that if bank can guarantee of instant reimbursement of wrong transactions will instil confidence in UPI.

> *Providing a guarantee to get the money reimbursed faster, after a wrong transaction will boost our confidence in using it.* (Interviewee #17)

In essence, Senior citizens raises concerns about efficiency of the complaint handling services provided by the bank and FinTech calling for simpler procedures, dedicated helpline and faster reimbursement procedures to address their needs.

Language Barrier

The language barrier is one of the significant factors that affects the widespread adoption of UPI. Most of the respondent expresses a great need for UPI platforms to provide guidance and assistance in their native languages in order to improve usage and comprehension. One of the respondents aptly summarizes the effects of language barriers as

> *Language is definitely a limiting factor. Not everyone can read and use it in English.* (Interviewee #16)

Another respondent clearly highlights the disparity in language proficiency among individuals, emphasizing that many in rural areas may only understand their mother tongue.

> *People with a basic education may not have issues when the app is in English. But people in the villages often only know their mother tongue. If the app is*

available in their own language, they will be more interested in using it. (Interviewee #3)

This preference of local language support is resonating with other respondents as well.

If it is in the local language, it will be easy. (Interviewee #10)

Personally, I will be more comfortable if it is in Tamil, my mother tongue. (Interviewee #17)

It would be helpful if the app were in Tamil. I can read and understand it if it's in Tamil. (Interviewee #11)

Senior citizens need this sense of language familiarity for adopting such novel technology. Another respondent provided a strategy to boost adoption rates by advocating for awareness campaign conducted in local languages.

They should raise awareness in our local language, which is not a big deal, right? (Interviewee #2)

So, the curial step is to address the language barrier by proving support and instructions in local language which enhances the adoption of UPI among senior citizens.

Complexity

Participants express reluctance towards adopting UPI due to the perceived complexity of the technology or application interface. One respondent, who attempted to use the app with their son's assistance, elaborates on the challenges they face in navigating the process:

I still struggle with understanding the sequential order of actions, such as finding the transfer option after a few steps, and sometimes I forget one of those steps, which makes it difficult to use. (Interviewee #16)

One respondent emphasizes the difficulty of using this technology, even for educated pensioners like themselves, highlighting that senior citizens with limited educational background may struggle to use it.

Even educated and retired people like me have difficulty in using it, so how can they do it? They can't use it. (Interviewee #1)

The respondents emphasizes that complexity poses a barrier to adoption, particularly for senior citizens, and suggests that simplifying the application interface would encourage them to adopt such technologies.

If G Pay only involves two steps, then I would be interested in using it. With just two steps to transfer money, it would be easy for me to use. (Interviewee #16)

This sentiment reflects the perception of senior citizens regarding the technology barrier that prevents them from using UPI, along with a call for its simplification.

5 DISCUSSION

Prior research studied the acceptance of mobile banking among the elderly (Msweli & Mawela, 2021). Also, some researchers have studied older adults acceptance of technology but they primarily used quantitative surveys for the study (Macedo, 2017). While existing research has provided insights into mobile banking acceptance of the elderly demographic (Jin et al., 2021), there remains a gap in exploring the factors influencing the acceptance of UPI among the elderly in India, which this study aims to uncover.

5.1 Intention to Learn UPI

We found that older adults are motivated to learn UPI with four primary motivational factors: Social Influence, Perceived Usefulness, Family Support and Compulsion. Where the first three factors relate to the constructs of the UTAUT2 model (Venkatesh et al., 2012). Social Influence relates to "Social Influence", Family Support relates to "Facilitating conditions", Perceived Usefulness relates to "Effort Expectancy" and "Performance Expectancy".

Social Influence was found to be influencing the adoption of UPI among younger adults and baby boomers (Saha & Kiran, 2022) this study confirms it also impacts senior citizens intention to use which is matching with the existing research (Jin & Fan, 2022). Participants were inspired by the adoption of UPI by individuals within their social circles and expressed a desire to learn the technology to keep-up with social norms. This finding resonates with previous research (Jin & Fan, 2022), where positive experiences shared by children and grandchildren can encourage senior citizens to overcome their reluctance. However, these findings contradict previous research done by Asmi and Ishaya (2012) analysing behaviours towards internet banking in the age segment of 55-65. It was found that peer influence and social norms had less impact on the attitudes of senior citizens in the UK. The explanation for this is that friends and family do not significantly influence senior citizens' intention to adopt, as they

tend to access mobile banking services considering security issues alone (Arenas-Gaitán et al., 2015). While social influence generally has a positive impact on UPI adoption intention, our empirical study revealed that family members can also negatively influence older adults and steer them away from adopting UPI citing financial risks which matches with the findings of Jin and Fan (2022). Another important finding was older adults exhibit an intention to adopt UPI out of the fear of missing out on these technologies as the society is rapidly moving towards the digitalization of financial services. This finding contrasts with existing literature Busch et al.(2021), which suggests that fear of missing out is only seen among adolescents and not in senior citizens.

Facilitating conditions refers to the "*degree to which an individual believes existence of organizational and technical infrastructure in place to help and support use of the technology*" (Venkatesh et al., 2012). In the context of our current research, the senior citizens perceive their children as the primary facilitators for UPI adoption, providing them with necessary assistance and support, rather than relying on organizational support and technical infrastructure. Jin and Fan (2022) in their research pointed out that the elderly expressed a preference for learning mobile banking from their family members and children, primarily due to the trust factor. This sentiment was echoed by majority of the respondents in our study as well. The lack of trust in unfamiliar entities, including banks and financial institutions, contributes to senior citizens security concerns regarding UPI. Another reason is senior citizens are more inclined to interact with their close family relatives like spouses, children and grandchildren than with strangers (Peek et al., 2016). Most of the literature on the acceptance of ICT among elderly emphasise that family support directly influence the use of ICT (Bianchi, 2021; Peek et al., 2016; Weck & Afanassieva, 2023). Bianchi (2021) in their study on how internet services can improve the wellbeing of the elderly indicates that familial support is imperative in internet acceptance and wellbeing of elderly, especially in developing nations that lacks the infrastructure. Furthermore, Bianchi argues that support provided by the family members can have more impact on senior citizens than the support provided by the organization, a sentiment that resonates with our research respondent as well. This might be attributed to the younger generation proficiency with technology, which facilitates transfer of knowledge to the elderly (Barrantes Cáceres & Cozzubo Chaparro, 2019), enabling them to effectively teach the elderly in a manner that they can understand. Furthermore, senior citizens express that their children to be present during the learning process for support, which also serves as a positive influence. This finding contributes to the existing literature on technology acceptance by the elderly by reinforcing the importance of family support in their adoption of technology.

Perceived Usefulness is defined as "*the degree to which a person believes that using particular system would enhance their performance*" (Davis, 1989). It can be related to the UTAUT2 constructs of Effort Expectancy and Performance Expectancy. Based on our study findings, it is evident that senior citizen perceives UPI as a highly useful tool. These findings align with the motivations behind young adults' adoption of digital banking and electronic payments, which in-

clude "perceived ease of use, perceived value, and utility perception." (Hua, 2008; Jin & Fan, 2022). In contrast to the motivation for adopting other ICTs like smartphones and social media platforms, where senior citizens often adopted them to overcome loneliness (Busch et al., 2021; Nicolaisen & Thorsen, 2014), respondents expressed that they find UPI beneficial because of its convenience, as it reduces the effort compared to traditional banking methods. This finding contradicts Laukkanen's (2016) study, where he outlines that non-adopters usually perceive mobile banking as inconvenient and far from beneficial. They believe that transactions made through mobile are not as easy and fast as the service providers claims it to be. The respondents even emphasised the advantages of UPI by drawing comparison with social media applications like YouTube. Participants also acknowledge the practical benefit of UPI, enabling them to perform transactions from the comfort of their homes and eliminating the need for personal visits to the bank. In essence, senior citizens are more likely to adopt UPI when the clearly understand the advantages it offer over traditional banking (Yee-Loong Chong et al., 2010). Therefore, it is necessary for FinTech companies and banks to promote and encourage the adoption of UPI among this demographic segment by establishing its value.

Compulsion is also another unique motivating factor that was uncovered during the findings of the research. It could be hard to relate in the western context but in India it's a factor due to the policy mandate and financial decisions from the government in the past. This includes the government demonetizing the 500 and 1000 denominations overnight in November 2016, aimed at curbing the black money such as undeclared income. However, the implementation faced heavy criticism for its abrupt nature, leading to financial losses and even loss of lives, due to the lack of proper study beforehand (Chaubey & Kumar, 2017). Following the demonetization, Indian government mandated the Goods and Service Tax (GST) in July 2017 which is a uniform tax system (Mohan & Ali, 2018), which was also criticized during the implementation phase since people were still recovering from the effects of demonetization which resulted in slowing down of economy even more. Furthermore, the government has mandated the linking of Aadhaar (India's biometric identity system) with various other sources like PAN, Income tax filings and mobile number which was criticised by security experts for eminent data privacy and security threat (Sadhya & Sahu, 2024). Despite these concerns, the government still proceeded with the plan. The general reasoning among public is that government can mandate any policy and see through it even if there are criticism with the project. Certainly, the mandate policies have benefits too, for instance the Pradhan Mantri Jan Dhan Yojana (PMJDY) is a financial inclusion scheme launched by the government that provides economically backward class with zero balance bank account. Subsequently, the government mandated the linking of Aadhaar with bank account, which facilitates Direct Benefit Transfer (DBT) scheme where social welfare benefits are directly credited to the beneficiary's account (Sadhya & Sahu, 2024), eliminating the need for cash. Drawing from this history of the government mandates, respondent expressed that they would be inclined to adopt UPI

if it becomes mandatory. The government is already promoting digital transactions in certain sectors, such as electricity bill payments, where the Tamil Nadu government has mandated paying digitally for transactions exceeding 2000 rupees.

5.2 Challenges in Adoption

In this section, we discuss the various challenges reported by participants in themes and in a comprehensive model.

Self-Efficacy and Awareness

Self-efficacy and Anxiety are two main reasons for the senior citizens to shy away from UPI and digital banking. According to Tsai (2014), self-efficacy relates to "perceived ease of use" which is one of the constructs of UTAUT. The respondents expressed doubts about their ability to operate UPI apps, despite already being familiar with smartphones and even social media in some cases. Their apprehension stems from the fact that UPI involves money transactions, which makes them anxious about financial loss. As study done by Peral-Peral et al (2020) confirms that self-efficacy and anxiety impacts the use of internet banking services among senior citizens this resonates with our current research. Anxiety referred here is specific UPI system anxiety. Peral-Peral et al (2020) research points out that there is difference between general technology anxiety and specific system anxiety. Similarly, he also reports significant gender-based differences among older adults regarding self-efficacy and anxiety. Specifically, men experience a decrease in perceived anxiety with an increase in self-efficacy, whereas women continue to experience anxiety despite gains in self-efficacy, a trend supported by our study as well. This lack of confidence stems from various factors, including low awareness levels, age-related challenges, limited literacy, and financial constraints. Among these factors, our research findings indicate that lack of awareness has a more pronounced effect compared to others. These findings aligns with the research of Peacock and Künemund (2007) and Msweli and Mawela (2021). Due to senior citizens lack of awareness about UPI, they exhibit a value barrier, where they perceive the technology adds no significant value to them (Lian & Yen, 2014). This segment of the population will start to use UPI once they understand its value (Mohapatra et al., 2020). To increase the awareness level about the UPI's value there should be some initiatives like targeted campaigns tailored for this demographic.

Security and Trust

Security acts as a significant factor that hinders the adoption of mobile banking. A study conducted by Baabdullah et al. (2019) revealed that security significantly influenced the intention to use mobile banking. Similarly, this echoes with

the findings of the current study where respondent emphasised security as an important hindrance factor. Respondents cited media reports on UPI scamming incidents as the primary source of their security concerns, leading them to perceive UPI as not as secure as they claim to be, promoting them to refrain from adopting UPI. Our study findings reveal that senior citizens fear hackers could get access to their personal banking information, aligning with the findings of the study done by Laukkanen and Kiviniemi (2010). The finding of our study indicates that individuals perceive greater risk, whether in terms of financial loss or other forms of loss, resulting in a negative impact on the adoption of mobile banking, a trend consistent with previous research (Luarn & Lin, 2005; Mohapatra et al., 2020).

The study further identified trust as a barrier hindering the adoption of mobile banking among senior citizens which resonates with the existing literature (Msweli & Mawela, 2021; Suh & Han, 2002). Bahmanziari et al. (2003) in their research on the importance of trust in technology acceptance stated that adopter must evaluate the trustworthiness of the technology based on the characteristic of the technology or service provider. Respondents of the research are unable to ascertain the trustworthiness of the UPI due to their limited awareness. Regarding the service providers, although the infrastructure is provided by the government, the interface is maintained by FinTech companies. Since these FinTech service providers are relatively new, the respondents cannot establish institutional trust. Furthermore, they highlighted vulnerability due to their age, which they perceive as a risk factor, leading them to distrust technology or any stranger offering assistance in this regard. This finding match with the existing research by Msweli and Mawela (2021). Participants also established privacy concerns related to UPI. They believe that UPI service providers may share their contact information with third parties, who can gain access to their accounts and incur a financial loss. This aligns with the findings of Jin and Fan (2022), as respondents are cautious about sharing their personal information by directives from banks and the government. Moreover, participants often associate telemarketing and spam calls with threat to their privacy, fearing that these calls could lead to unauthorized access to their mobile banking accounts. In essence, security, trust and privacy are significant barriers to the adoption of UPI among senior citizens and our findings matches the existing literature adding to the study about the influence of security and trust in technology adoption.

Age-Related Factors

Senior citizens expressed their reluctance towards UPI is mainly due to their age and the factors associated with their old age. Respondents in the study often voiced health-related concerns because of their old age. For example, they highlighted memory concerns that make it difficult for them to recall important information such as password and PIN. These findings resonates with the literature of Jin and Fan (2022). Other health-related concerns were also raised by respondents, such as issues with their vision and motor functions (Msweli &

Mawela, 2021). They expressed that due to their poor vision and trembling hands, they often make mistakes when pressing keys, so they are concerned that they may press the wrong key while typing the password and fear their account might be locked. In some cases, deteriorating health is the sole reason for their resistance to UPI. One respondent mentioned that her chronic health condition is the primary obstacle preventing her from adopting UPI, making her dependent for assistance for certain tasks. Respondents also expressed that due to their age their cognitive abilities have slowed down, which matched with the findings of (Bianchi, 2021; Kalman et al., 2015). Chaouali and Souiden (2019) in their research titled '*The role of cognitive age in explaining mobile banking resistance among elderly people*' suggests that the impacts of usage and risk barriers are more significant for senior citizens with cognitive impairments than the younger generations. This finding resonates with our research, revealing that respondents perceive UPI as primary beneficial for younger generations. This generation gap is further evident when one of the respondent's expressed confidences that the future generation of senior citizens will easily accept UPI and other digital payment technologies due to their technology proficiency. Research by Steel et al. (2009) established that baby boomers find it easier to adopt e-healthcare services due to their higher literacy rates compared to previous generations. Similarly, baby boomers in India easily accepted UPI compared to the previous generation (Saha & Kiran, 2022). There's a lack of attention from the financial institution towards this segment. By developing applications that tend to the needs of this segment, FinTech companies can tap into this market segment effectively. This initiative can also yield a positive impact on senior citizens, as previous technology studies have shown technology adoption can improve the quality of life among the elderly (Hough & Kobylanski, 2009).

Complexity

Respondents expressed that the complexity of the UPI apps is one of the barriers to the adoption of UPI. This finding matches with Joseph's (2010) study on individuals resistance to IT innovations where he points out that people will not adopt a novel technology if it's too complex. Similarly, participants of the study expressed that the application was too complex for them. One of the respondents shared her experience of attempting to learn to use UPI with her son's assistance, but when she tried to do it on her own, she could not. She expressed her frustration with the complexity of the app, citing the numerous steps involved, which made it challenging for her to understand and remember the sequence of actions required. She further advocated for the simplification of the app to involve just two steps. So, this segment of the demographic will adopt UPI if it is easy to use and understand the steps involved. This matches with the findings of Chauhan et al. (2018). Respondents reported that they find the process of raising complaints difficult for them to understand and called for simplifying the process. Some respondents expressed greater inclination to use UPI if banks or FinTech companies offered instant refund for erroneous transac-

tions. So, FinTech companies should invest in developing a simplified application for this segment to promote the adoption of UPI.

Resistance to Change

Comfort with traditional banking methods is a key factor hindering senior citizens transition to UPI. This traditional barrier is an important reason for their resistance to change (Lian & Yen, 2014). Respondents of our study expressed that they are more comfortable with cash based transactions and wanted to personally visit the bank and withdraw the money (Jayachandran, 2019; T. Laukkanen et al., 2007; Msweli & Mawela, 2021). This is mainly due to the trust factor and preference of social interaction. This is evident when one of the respondents expressed her preference for visiting the bank, as it provides an opportunity for her to step out of her house and interact with people (T. Laukkanen & Kiviniemi, 2010). They got used to the habit of withdrawing cash from the bank and paying for commodities in cash. Moreover, the perspectives of senior citizens differ from those of subsequent generations, as they tend to hold more conventional attitudes towards technology (Chee, 2024). They possess a psychological barrier which is caused by their preexisting beliefs (P. Laukkanen et al., 2008). This perception leads them to view mobile banking as a threat to their hard-earned money, prompting them to avoid it. This mandates a behavioural change within this segment, which falls specifically under the purview of the government's intervention. It calls for targeted campaigns and initiatives, such as educational programs, and incentivized schemes, aimed at promoting digital banking, with a particular emphasis on UPI.

Language Barrier

India is a linguistically diverse country with 22 official languages. While English and Hindi serve as the official languages of the union government, each of the 29 states and 7 union territories maintains its regional language as an official language and still enjoys the right to education in their mother tongues (Singh & Dhussa, 2020). So, most of the senior citizens expressed adopting UPI due to the language being English, which is the dominant language for banking (Halaweh, 2011). This is primarily attributed to the low literacy rate within this segment, a factor that aligns with the research findings of Msweli and Mawela (2021). Many elderly may not have access to a formal education or have access to limited education in their mother tongue making it challenging for them to accept UPI interface which is in English. Moreover, elderly who had their education in English and are fluent in it expressed they are struggling to understand a few words and technical terms which echoes with the findings of Komninos et al. (2014). They advocate for UPI interface with local language support, as well as for the design interfaces that are understandable and usable even by senior citizens with low literacy and limited English proficiency (Firdhous, 2012).

Cultural Impact

Our study was conducted on senior citizens living in Tamil Nadu, India. Given the cultural context of India, their banking practices may differ from those observed in other parts of the world. The respondents of this study reported some instances which cannot be found in western countries. For example, in India, it is customary to seek blessings from family elders on one's birthday, often followed by the elder family member presenting monetary gift to the younger generation. This sentiment was echoed by one respondent, who expressed that young children seeking her blessings would not use UPI. This custom is not widespread in other nations.

Study done by Bankole et al. (2011) on mobile banking adoption in Nigeria revealed that culture influences user behaviour and the adoption of mobile banking in the country. Jin and Fan (2022) add to the discussion by suggesting cultural factors in China as one of the factors influencing senior citizens widespread adoption of WeChat, a super app with mobile payment capabilities. These findings are not supported in other western countries. Some common banking practices among senior citizens in western countries are uncommon in India. For example, senior citizens in western countries like the US often use personal checks (Abood, 2015), a practice not commonly seen in India. Similarly, senior citizens in western countries have access to credit cards whereas senior citizens in India are often negatively associated with credit and even debit cards (Biradar, 2024). This is primarily attributed to the dependency of senior citizens. In Indian culture, families are responsible for fulfilling the material and non-material needs of their elders, including financial support. Research conducted by Rajan and Kumar (2003) revealed that many elderly reside in a joint family setting alongside their children or grandchildren and fewer instances of living with other relatives. The adults within the family serve as providers for the elderly. Despite the presence of various old age pension schemes, these pensions are often insufficient, making senior citizens financially dependent on their families (Bakshi & Pathak, 2016). The findings of these studies corroborate those of previous research. Most of the respondents of this research reside in a joint family setting with their children and are financially dependent on them despite being pensioners. Cultural values instilled upon the younger generation emphasise that the parents looked after them in the early years and now it is the children's responsibility to care for the elderly. This dynamic discourages elderly parents from adopting UPI or any other digital financial services as their financial needs are already taken care of by their children or family. In summary, while our research scratched the surface of the influence of culture on senior citizens internet banking practices, it underscores the necessity for more in-depth research is needed to further investigate cultural effects.

In conclusion, the above are the important factors that act as barriers to the adoption of UPI among the elderly in India.

5.3 Proposed Design Guidelines

One of the important objectives of the research is to propose few design guidelines for FinTech companies to empower financial inclusion for the elderly. In this section, these guidelines are presented based on the research findings, ensuring solutions addressing senior's preferences and the challenges they encounter.

A critical recommendation is a need for user-centred approach to application design and development specifically catering to the needs of the target audience which is the senior citizens. This necessitates a clearly defined requirement for refined app design and development. Previous research has highlighted instances where inadequate definition resulted in applications that failed to meet the needs of the target audience (Shamsujjoha et al., 2024). Following are some of the design guidelines aimed at fostering a more user-centric design approach.

One of the frequently cited barriers by participants was the complexity of the application. The extensive number of steps involved causes a significant issue for senior citizens as they often forget the sequence of steps due to their declined cognitive ability and memory issues. Aligned with prior research, this research advocates for a design approach that minimizes the complexity of the application for the elderly, emphasizing the development of a senior-friendly mobile application (Holzinger et al., 2007). This emphasis on simplified application resonates with the participant's feedback, as they expressed desire for a simplified version, allowing them to complete transactions with minimal steps. Supporting this notion, Ziefle and Bay (2005) study provides empirical evidence that simplifying applications for seniors can yield real-world benefits that may even surpass theoretical expectations. This convergence of research and user experience highlights the importance of user-centric design.

Beyond application complexity, another significant usability challenge reported by most senior citizens is the lack of regional language support. Currently, most of the UPI applications operate solely in English. To address this, FinTech companies should prioritize offering a multilingual UPI application that covers all the major Indian languages. However, simply offering multiple languages is not sufficient. It is crucial to maintain a simplified interface design across all languages, avoiding complex technical jargon that may further confuse users. Furthermore, FinTech companies should consider incorporating voice-based interfaces for elderly users who struggle with navigating the app. This will allow users to interact with the application through commands, further promoting inclusive design. This aligns with the previously discussed importance of user-centred design principles.

Another improvement could be enhanced display and keyboards for visibility. Respondent expressed difficulty using the small keyboard, leading to typos, which were compounded by age-related vision problems. To address this , developers can implement design features that enhance display clarity

and provide alternative user input options. Holzinger et al. (2007) advocate for enhancing the size of the target areas such as buttons, icons and other touch elements within the application. This can be complemented by ensuring ample space between these elements to reduce accidental touches. Along with the above features colour contrast themes can also be incorporated to the design which improves readability for senior citizens with vision impairment. Furthermore, there could be an option for customizing the display settings based on the user preference.

Similarly, another important factor that acts as an impediment to the senior citizens mobile banking adoption is the authentication process. Currently, the authentication involves biometric and password authentication. Since most of the respondents established their difficulty in remembering the password, the proposed guidelines is to include only biometric authentication for a easy authentication process for the elderly. Msweli and Mawela (2021) study findings suggest that the elderly prefer biometrics as an authentication method because it's easier and more secure.

In addition to the above design recommendations, designers and developers can explore the integration of assistive technologies like AI chatbots to enhance user-experience. AI chatbots can provide real-time, in-app assistance to users in their preferred language using Natural Language Processing (NLP). Furthermore, AI and machine learning algorithms can be harnessed to personalize the user experience within the application. Resonating with this approach, Shamsujjoha et al. (2024) suggest that incorporating AI and machine learning algorithms can significantly improve the human-centred design of e-Health applications, particularly those used by elderly populations.

Expanding on our research foundation, FinTech companies can further enhance their understanding by conducting extensive customer surveys specifically targeted toward senior citizens. This can provide valuable insights into their preferences and challenges. Furthermore, they can integrate senior citizens directly into the application development process which creates opportunities for uncovering significant insights for designing truly inclusive products. This will increase UPI adoption and empower senior citizens to participate in the digitalization of financial services, achieving financial inclusion in India.

5.4   Recommendations for Policy Makers

Prior research suggests that government support plays a significant role in shaping user intention to adopt internet banking (Yee-Loong Chong et al., 2010). Despite the Indian government's efforts to strengthen the financial infrastructure and promote digitalization, a gap persists in addressing the needs of senior citizens. In this section, we outline a series of policy recommendations for consideration by policymakers based on the research findings.

Study findings suggest that most barriers to UPI adoption among senior citizens, such as self-efficacy, lack of knowledge, security, and privacy issues,

stem from senior citizens low awareness levels. This underscores the importance of government intervention to address the low awareness among this demographic. Targeted awareness programs specifically tailored for this demographic could be a valuable strategy to promote UPI adoption. These programs can be informative workshops and public awareness campaigns specifically designed for senior citizens. This awareness program has dual benefits. Firstly, it increases their awareness of UPI, and secondly, training sessions enable senior citizens to navigate UPI confidently. Furthermore, these programs can directly address the security and privacy concerns they share (Msweli & Mawela, 2021).

The availability of technology alone is insufficient to drive user adoption, additional incentives are necessary (Panagariya, 2022). This notion is reflected in the current study, where some research respondents expressed that they would consider adopting UPI if there were some monetary benefits associated with it. However, it is crucial to acknowledge that monetary rewards are not the primary motivator for all seniors, and their long-term sustainability poses a financial burden on the government or financial institutions. Instead, these incentives could be user-centred solutions that will be more effective in the long run. Collaboration between the government and FinTech service providers is crucial to ensure easy access to UPI for senior citizens. They should prioritize creating senior-friendly interfaces, by implementing the design guidelines outlined in the previous section. Government promoting the development of inclusive applications for senior citizens, presents a more sustainable and effective user-centred approach to enhance the adoption of UPI.

Policymakers should prioritize strengthening consumer protection laws and regulations to safeguard the financial transactions of elderly individuals using UPI. Additionally, the government should implement stringent measures to prevent and prosecute fraud related to UPI transactions involving senior citizens (Tripathi et al., 2019). This might include establishing a specialized law-enforcement units focused on tackling cybercrime targeting senior citizens. Furthermore, it is crucial for policy maker to advertise and promote the availability of support services specifically designed to assist elderly individuals who may fall victim to fraud or cybercrime (Kemp & Pérez, 2023).

Finally, to ensure the long-term success of mobile or digital banking adoption among senior citizens, continuous investment in research and development (R&D) is crucial. It could involve funding studies specifically focused on the interaction between senior citizens and digital payments. For example, it could entail a study investigating digital payment adoption among elderly individuals from diverse cultural and socio-economic backgrounds, which provide a more nuanced understanding of the challenges faced by different sub-populations of senior citizens. Ultimately, these studies will aid in developing inclusive technologies and targeted policy interventions, thereby fostering digital financial inclusion of the elderly population in India.

6 CONCLUSION

While India rapidly embracing the digital economy, it poses a critical challenge as the elderly population in India is often overlooked when it comes to technology adoption, particularly in the realm of mobile banking (Hassan & Meraj, 2019). This research aims to contribute to the academic literature on elderly technology adoption, focusing specifically on UPI by examining senior citizens perspectives on UPI and identifying the factors impacting their adoption of this technology.

This study addresses two research gaps in the existing literature. Firstly, there is a lack of research that explores the phenomenon of UPI adoption among senior citizens in India (Gochhwal, 2017), specifically in the region of Tamil Nadu. Existing studies on UPI tend to focus on general user adoption, neglecting senior citizens perspectives and the unique challenges faced by this demographic. Secondly, existing adoption study on UPI relies primarily on quantitative methods (Fahad & Shahid, 2022; Saha & Kiran, 2022). This study employs a qualitative method, leveraging in-depth interviews to gain rich insights beyond the limitation of quantitative data. Thus, our research was guided by the following research questions: (1) How do senior citizens perceive UPI? Are there any enabling factor for UPI adoption among elderly? (2) Why are senior citizens hesitant to adopt UPI for their financial transactions?

Senior citizens acknowledge the potential benefits of UPI (Unified Payments Interface) for digital banking, particularly its ability to enhance convenience and efficiency in the financial transactions. However, despite recognizing its usefulness, they often exhibit hesitancy towards UPI adoption. Through the thematic analysis of the data collected, the following critical factors for intention to adopt UPI among senior citizens were found namely social influence, perceived usefulness, familial support, and compulsion. The influence of friends, family and peers emerged as a significant factor influencing senior citizens intention to adopt. Assistance from family members was identified as a significant enabler, as senior citizens emphasized the support required from their blood relatives in the learning process. Followed by external factor, such as policy mandate were found to motivate senior citizens to adopt UPI.

Secondly, the research findings highlight several significant barriers to the adoption of UPI among senior citizens. These barriers include Low perceived self-efficacy and awareness, security and trust, age-related factors, complexity, resistance to change, language barrier and cultural impact. Furthermore, the research findings highlight the importance of collaboration required between policymakers and FinTech service providers by offering recommendations for policy changes and design guidelines. This combining effort will facilitate the wider adoption of UPI among senior citizens by addressing their concerns.

While qualitative interviews aim to provide rich and in-depth understanding of a phenomenon rather than generalizable results (Weck & Afanassieva, 2023), the identified factors influencing UPI adoption among senior citizens may hold relevance for studies related to mobile banking adoption among senior citizens in other developing countries with similar economic and cultural characteristics. This could include nations like Bangladesh, Pakistan, and Nigeria, and other African countries with similar cultural and economic traits, such as Kenya and Zimbabwe. However, it cannot be generalized to developed countries like the US or UK due to the difference in cultural and technological infrastructure.

6.1   Limitations of the Study

While the current study presents a comprehensive analysis of the senior citizens perspective on UPI, it acknowledges some limitations. The primary limitation is the relatively small sample size, consisting of 17 interviews. As highlighted earlier, India is a vast country with cultural and linguistic diversities. This limited sample size may not adequately capture the experiences and challenges faced by senior citizens across the nation, thus impacting the generalizability of the findings to the broader population.

Secondly, the research participants were exclusively recruited from a single Indian state, which underscores a potential limitation. Each Indian state has its own cultural traits and social norms, that are unique to that region, suggesting the findings from this study can be different if the research were to be conducted in other parts of the country. Moreover, it is noteworthy that the research participants predominantly hailed from urban areas and possessed some form of education, with backgrounds mostly in the middle or upper-middle class economic statuses. This demographic skew could introduce some degree of bias to the research findings, as there is no representation of perspectives from senior citizens from rural or economically underprivileged regions. To obtain a more holistic understanding of the phenomenon, future research should strive for participants from other regions, including rural areas and different socio-economic backgrounds. Such inclusivity would have enriched the research findings even further.

The third main limitation of the study lies in the constraints imposed by time and resources. The research schedule and reliance on personal funding

inevitably limited the comprehensiveness of the study. This may have impacted the depth and breadth of the data collection process.

In essence, the research acknowledges limitations related to sample size, geographical scope, and participant demographics. However, findings offer valuable insights into the key barriers and enablers influencing the adoption of senior citizens. Future research can address these shortcomings and strive for excellence.

6.2 Implications for Future Research

This study is an initial attempt to identify factors that impact mobile-based banking adoption among elderly customers in India. Future research could explore this topic from alternative perspectives. While the theoretical framework provided a solid for this research, still it could act as a baseline upon which scholars and researchers can build further enhancement, focusing on the diverse contexts.

While qualitative research is adept at uncovering nuanced themes and sub-themes of a phenomenon, it does have some inherent limitations. While they provide rich insights into individual perspectives, the findings lack statistical rigor, which may undermine their credibility. Therefore, future research could consider employing quantitative and mixed methodologies to obtain a more comprehensive understating. Conducting such studies across various regions of the subcontinent could provide a more holistic perspective on the subject.

Another important consideration for future research could be avoiding homogenization of the older individuals as a single demographic. Instead, researchers could categorize them into sub-groups like "younger older adults" and "senior older adults" or based on variables like educational and economic backgrounds (pensioners or retirees). This approach acknowledges the diversity within the older population and allows for a more nuanced analysis. For instance, findings from previous research indicate that "younger older adults," aged between 60-65, possess technological literacy unlike preceding generations but may still exhibit hesitancy towards adopting novel technologies.

Therefore, future studies can delve deeper into the unique characteristics and challenges within these subgroups, enabling a more comprehensive understanding of mobile banking adoption among older individuals. Furthermore, for more holistic approach future research endeavours could incorporate additional perspectives from policymakers, banking institutions, and FinTech companies on this phenomenon.

In conclusion, the study acts as a starting point for further exploration in this less explored stream of technology acceptance. Highlighting the importance of continuous research to the evolving digital landscape of mobile banking adoption among the elderly in India.

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APPENDIX 1 Interview Questions

Personal Information
1. To begin, could you tell me a little about yourself? (Optional: Name, Age)
2. How comfortable are you using a smartphone on a daily basis? (for checking technology proficiency)

Awareness of UPI
3. Have you ever heard of mobile payment options like Google Pay or Pay TM?
4. If you have heard of them, where did you learn about them? (This helps understand awareness channels)
5. Are you familiar with a service called UPI? (short description of UPI for participants who lack UPI knowledge)

Performance Expectations:
6. As a senior citizen, what's your thoughts about UPI?
7. What concerns do you have regarding adopting UPI for your financial needs?

Effort Expectations:
8. What factors make it challenging or easy for you to consider using UPI for your financial transactions?
9. Also, what efforts are involved in getting the money you need for your financial needs?

Social Influence:
10. How do the opinions and suggestions of people in your social network influence your inclination to use UPI for financial transactions?
11. Does their opinion's more or less likely to influence your decision?

Facilitating Conditions:
12. What kind of help or support do you think would encourage you to use UPI for your financial transactions?

Hedonic Motivation:
13. What factors do you think could motivate older adults to adopt UPI?
14. Would incentives such as offers or discounts increase your interest in trying out UPI?

Price:
15. How does the cost of using UPI and any associated non-financial costs affect your decision to use it for your financial transactions?

Habit:

16. How do your existing habits impact your intention of using UPI for your financial transactions?

Note: The interview format allowed for a dynamic approach. The listed questions served as a starting point, and follow-up questions were tailored to the unique experiences and perspectives expressed by each participant.

APPENDIX 2 Respondent's Profile

Respondent	Profile
Interviewee #1	an 81-year-old female pensioner worked in a government hospital.
Interviewee #2	an 82-year-old male pensioner.
Interviewee #3	a 60-year-old male central government employee who is set to retire in May.
Interviewee #4	a 73-year-old female pensioner.
Interviewee #5	an 87-year-old female pensioner.
Interviewee #6	a 61-year-old male government schoolteacher and is about to retire in June.
Interviewee #7	a 79-year-old male pensioner.
Interviewee #8	a 70-year-old female pensioner who worked at a government hospital.
Interviewee #9	a 61-year-old female language teacher employed in a private school.
Interviewee #10	a 77-year-old female homemaker.
Interviewee #11	a 63-year-old female homemaker.
Interviewee #12	a 68-year-old female entrepreneur who runs a business selling homemade food products.
Interviewee #13	a 61-year-old male entrepreneur involved in the software business.
Interviewee #14	a 64-year-old female pensioner.
Interviewee #15	a 67-year-old retired male who worked in a private sector company.
Interviewee #16	a 72-year-old retired female university professor.
Interviewee #17	a 60-year-old male business owner.